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Air Quality Data for Nonmetallic Inorganic Ions: NH4, NO3, SO4 from the National Air Surveillance Networks, 1975

(U.S.) Environmental Monitoring and Support Lab
Research Triangle Park, N.C.

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From the National Air Surveillance Networks

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This report lists the urban and nonurban concentrations of 3 nonmetal inorganic constituents of suspended particulate matter from samples gathered during calendar year 1975 by the cooperating stations of the National Air Surveillance Network (NASN). The individual 24-hour data are summarized as cumulative frequency distributions for each site.

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AIR QUALITY DATA

FOR NONMETALLIC INORGANIC IONS: NH_4^+, NO_3^-, $SO_4^=$

1975

FROM THE

NATIONAL AIR SURVEILLANCE NETWORKS

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DISCLAIMER

This report has been reviewed by the Environmental Monitoring and Support Laboratory, U.S. Environmental Protection Agency and approved for publication. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

PREFACE

The Environmental Monitoring and Support Laboratory (EMSL) of the Environmental Research Center, Research Triangle Park, Office of Research and Development, Environmental Protection Agency, with the assistance and cooperation of state and local agencies, conducts a variety of air sampling activities to obtain information about the air quality in the United States. Air quality data of three nonmetallic inorganic ions in particulate matter are presented in this report.

Updated listings will be provided as more current data are available. Any subsequent changes in the introductory material (site descriptions, data table presentations, laboratory methodology, etc.) made by EPA will be forwarded on a routine basis.

ABSTRACT

Samples collected during 1975 by the cooperating stations of the National Air Surveillance Network (NASN) provided the data for summarizing the annual urban and nonurban concentrations of three nonmetallic inorganic ions in suspended particulate matter. The ions are ammonium (NH_4^+), nitrate (NO_3^-), and sulfate ($SO_4^=$). Concentration data are presented as cumulative frequency distributions. The arithmetic and geometric means and standard deviations are also reported.

Three previous EPA publications, APTD-0978, APTD-1466, and EPA-600/4-77-003, list data collected during 1968, 1969-1970, and 1971-1974, respectively, for the three types of ions.

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The data in this publication were collected with the generous support of the many state and local air pollution control agencies that operate the NASN stations. Also, the 10 EPA Regions have participated in this program since 1973 by sending the high volume filters to the centralized laboratory of the Environmental Monitoring and Support Laboratory.

The authors also thank those who contributed their time and effort to publishing this document.

SECTION 1

INTRODUCTION

ORGANIZATIONAL STRUCTURE

The Environmental Protection Agency (EPA), with the assistance and cooperation of state and local agencies, conducts a variety of air sampling activities to obtain information about the air quality in the United States. One such program, the National Air Surveillance Networks (NASN), has existed for over 20 years. The network has grown and undergone many modifications since its beginning, especially during the last 5 years. Table 1-1 catalogues these recent changes.

The first change, in sampling schedule, was brought about to encourage synoptic sampling with state/local ambient monitoring programs. In addition to assisting in the operation of the EPA sampling network, state and local air pollution control agencies administer their own air pollution control programs.

The second change, decentralization, was made to shift air monitoring responsibility from one centralized laboratory to 10 EPA regional laboratories. This modification was implemented over the 14 month period from December 1972 through January 1974. Moreover, in January 1974, the responsibilities of the 10 EPA Regional Offices were extended further to the overall management of the NASN sites. Additional duties included weighing the sample filters and determining the concentrations of total suspended particulates (TSP). Table 2 and Figure 1 indicate the locations of the Regional Offices and the geographic areas of responsibility.

After completing their tasks, the EPA regional laboratories sent the sample filters to the EPA filter bank for routine trace constituent[1] analyses. The filters were stored there for non-routine, special analyses as required.

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[1] Metals, nonmetallic inorganic ions, and BaP.

TABLE 1-1. NASN NETWORK MODIFICATIONS

Month/Year	Change	Impact*
January 1972	Sample schedule changed from random biweekly to 12-day systematic samples, first sample collected 1/10/72.	All sites
December 1972	Decentralization, Region II	NJ, NY, PR
April 1973	Decentralization, Region I	CT, ME, MA, NH, RI, VT
December 1973	Decentralization, Regions V, VII, VIII, IX, X	IL, IN, MS, MN, OH, WI, IA, KS, MO, NE, CO, MT, ND, SD, UT, WY, AZ, CA, HI, NV, AK, ID, OR, WA
January 1974	Decentralization, Regions III, IV, VI	DE, DC, MD, PA, VA, WV, AL, FL, GA, KY, MS, NC, SC, TN, AR, LA, NM, OK, TX

*Abbreviations coincide with standard U.S. mail code designations for states.

Although pollutant monitoring was decentralized, the analysis and publication of the trace pollutant data remained the responsibility of one laboratory, the Environmental Monitoring and Support Laboratory (EMSL), Research Triangle Park, North Carolina. Prior to January 1974, sample filters also were weighed and analyzed for TSP by EMSL; however, after this date, the EPA regional laboratories performed these tasks as mentioned previously.

SAMPLE COLLECTION

Samples were collected at approximately 300 urban and 35 nonurban NASN sites located across the country. The urban sites are generally located within a city or town or adjacent suburbs. The nonurban sites were originally located in rural or remote areas, although with the passage of time, many of these rural areas, especially in the northeast, have become more heavily populated and thus are subject to increasing influences of spreading urbanization. Voluntary operation of each site is maintained through the generous assistance of local or state agencies and individuals such as park rangers, firemen, or policemen.

Prior to 1972, 24-hour samples (beginning at midnight) were collected according to a biweekly (26 samples per year) modified random sampling schedule. The schedule was modified to ensure equal representation for each of the seven days of the week. Since 1972, however, samples have been collected every 12th day (30 or 31 samples per year). The initial sampling date was January 10, 1972. This sampling schedule eliminates the need for redesigning a new sampling schedule each year. In addition, it is easily implemented in the field.

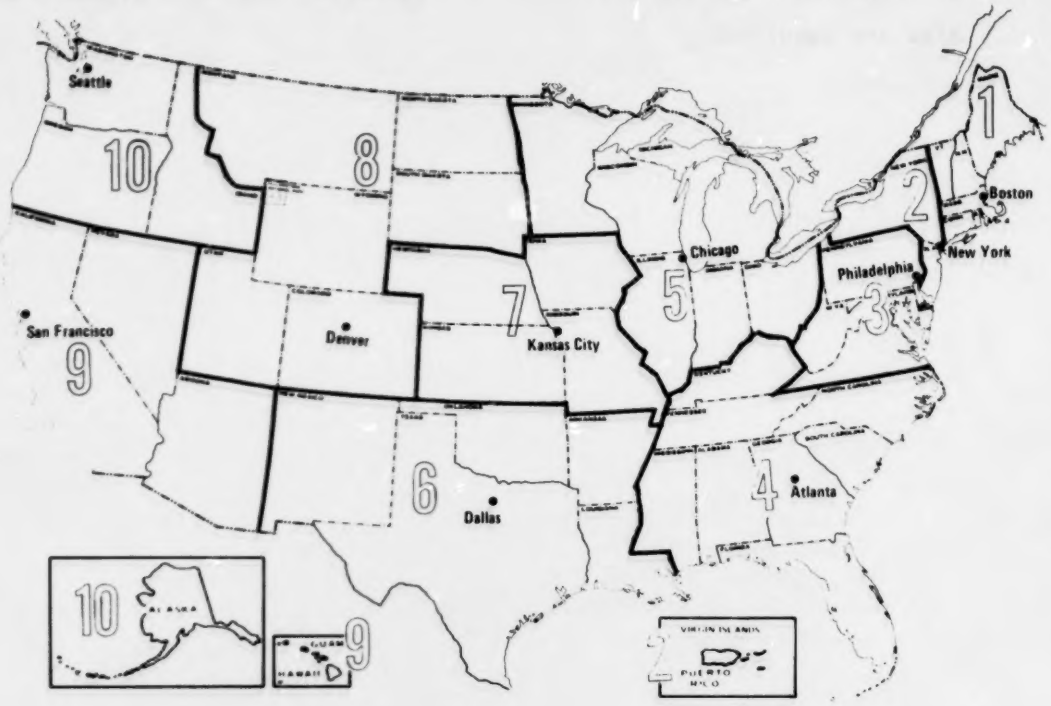
DATA HANDLING AND ANALYSIS

Beginning with the 1974 samples, the responsibility for managing the NASN was given to each of the 10 EPA Regions (Table 1-2). Prior to that time one centralized laboratory located at Research Triangle Park, North Carolina, weighed and analyzed the high volume filters. The Regions now send the total suspended particulate values to the National Aerometric Data Bank (NADB) and the weighed filters to the EPA Filter Bank (FB) for routine trace constituent analyses and storage in the Filter Bank for non-routine

TABLE 1-2. EPA REGIONS AND LOCATIONS OF REGIONAL OFFICES

Region	Regional Office Location
I	Boston, Massachusetts
II	New York, New York
III	Philadelphia, Pennsylvania
IV	Atlanta, Georgia
V	Chicago, Illinois
VI	Dallas, Texas
VII	Kansas City, Missouri
VIII	Denver, Colorado
IX	San Francisco, California
X	Seattle, Washington

Figure 1-1. EPA Regions and Regional Offices



special analyses as needed. The resulting data are published by EMSL and are sent to the National Aerometric Data Bank (NADB) for archiving.

The sampling data were analyzed by EMSL to determine those data to exclude from data summaries because of anomalies. The precision and bias of the data were determined using statistical analyses. The overall accuracy of the sampling data was evaluated to assist with interpretation of the air quality summaries.

The air quality summaries include annual concentration data classified as urban and nonurban origin and compiled for the nation as a whole and also for individual site locations. The data are presented as cumulative frequency distributions, and the arithmetic and geometric means and standard deviations also are tabulated.

SECTION 2

QUALITY CONTROL

INTRODUCTION

This section presents the quality control data from which analytical detection limits and analytical performance were determined. The assessment of analytical performance includes the estimation of precision and bias. These estimates are combined statistically to determine an overall measure of analytical quality assessment.

To ensure that only valid data were used, the data were subjected to a stringent test for outliers. A Grubb's statistical test for multiple outliers was used as described in Appendix A. The data were compared within a year and against the previous three years to determine whether the values were outliers. All outliers were reported to the laboratory for reanalysis of the sample filters.

Of the samples analyzed, thirty-four (34) sulfate and seven (7) nitrate samples were reanalyzed. Five (5) of the new sulfate values and three (3) of the reanalyzed nitrate values were significantly different from corresponding values originally reported. Consequently, these eight (8) values were considered to be indeterminant and eliminated from the data set. Because of the decay inherent in the ammonium on the filters, reanalysis was not performed to determine outliers of ammonium ions.

BLANK FILTER ANALYSES AND LOWER DETECTABLE LIMITS

Table 2-1 lists the average concentrations of the three ions found in blank filters. The blank value was determined by analyzing a large number of clean (unexposed) filters from the filter lot used by the NASN. Starting in 1974, blanks have been analyzed concurrently with exposed filters.

The results of the blank filters were used to correct the raw analysis values. For the filter lot used for sampling during the period 1971 through

TABLE 2-1. BLANK FILTER AND LOWER LIMIT OF DISCRIMINATION

Ion	Year	Concentration, $\mu g/m^3$*	
		Blank Filters	Analytical Limit of Discrimination (LD)
Ammonium	1971-1974	< 0.05	0.05
	1975	< 0.1	0.1
Nitrate	1971-1974	< 0.06	0.06
	1975	0.1	0.05
Sulfate	1971-1973	0.8	0.6
	1974	0.5	0.2
	1975	1.3	0.05

*These values were calculated assuming an average of 2500 cubic meters per filter.

1973, analyses of blank filters were run prior to the use of the lot, and a constant blank correction applied during these years. Results of analyses for 1974 and since have been corrected by year according to the blanks analyzed concurrently with the samples.

The analytical limit of discrimination (LD), or minimum detectable limit, values are also listed in Table 2-1. In earlier reports, separate minimum detectable limits were given for urban and nonurban samples because the portion of each filter used for analysis of nonurban samples was larger than that for urban samples in order to obtain enough particulate matter for analysis. Beginning with the samples for 1974, the portions of each filter used for analysis have been the same for both urban and nonurban samples, the portion being the same as previously used for urban samples. Therefore, the LD values for 1974 and 1975 apply to both urban and nonurban samples.

The LD values were determined by fitting a linear equation to the noise level as a function of concentration and extrapolating to zero concentration. The noise level was measured as the standard deviation of repeated analysis at the same concentration. The LD values given in Table 2-1 are 1.96 (2-sigma) times the extrapolated standard deviation and therefore represent an upper 97.5 percent limit for analytical results expected at zero concentrations.

It is noted from Table 2-1 that for the sulfate analysis, the LD had decreased since 1973. This decrease has been attributed to the replacement of the Autoanalyzer, Technicon I with the Technicon II. Although analyses for nitrate and ammonium ions have also been made on the Technicon II since 1973, no such decrease has been evident for the nitrate and ammonium ion analyses.

PRECISION

Table 2-2 presents precision estimates for the various analyses. The measures of precision are expressed as percentages of concentration level because precision is generally concentration dependent.

Precision estimates are based upon the percent difference between analysis of extracts from two different filter strips from the same filter. Thus, the measure of precision includes variation caused by the cutting, extracting, and analytical processes as well as any actual variability

between filter strips. Precision data were generated throughout the analysis period. Duplicate strips of every 10th sample were analyzed. For 1975 samples, approximately 500 pairs of duplicate strips were analyzed for each ion. From analyses of these duplicate strips, precision estimates have been obtained. In determining the estimates, a number of outlier values were omitted from consideration. These outlier values resulted when excessive percentage differences between the paired data were obtained. For each pair of data, percentage differences were computed by the following formula:

$$\%d = \frac{x_1 - x_2}{\frac{x_1 + x_2}{2}} \quad (100) \qquad (1)$$

where $\%d$ = percentage difference between analyses of duplicate strips (difference between values divided by the average of the two values), percent

x_1, x_2 = concentration values of the two analyses of duplicate strips, $\mu g/m^3$

For each of the different pollutant concentration ranges as shown in Table 2-2, the average percent difference ($\overline{\%d}$) and the standard deviation of percent differences ($S_{\%d}$) were calculated. The standard deviation of percentages is calculated by the following equation:

$$S_{\%d} = \left[\frac{\Sigma \%d^2 - \frac{(\Sigma \%d)^2}{n}}{n - 1} \right]^{1/2} \qquad (2)$$

The above standard deviation applies to the percent differences of the results from the duplicate strips, and provides a basis for control limits which can be applied to the results of future duplicate strip analyses. The standard deviations and the 99% control limits which are associated with the percent differences between duplicate strips are shown in Table 2-2.

The standard deviations of Table 2-2 must be divided by $\sqrt{2}$ to obtain the standard deviation (actually coefficient of variation) which measures the precision of an individual reported pollutant concentration value. These values are shown in Table 2-2. These coefficients of variation can be used for computing confidence limits on individual reported pollutant

TABLE 2-2. MEASURES OF PRECISION ON 1975 NASN FILTERS

Concentration Level $\mu g/m^3$	Differences Between Duplicate Strip Analyses		Individual Analysis Values	
	Standard Deviation of Percent Differences $S_{\%d}$, %	99% Control Limits ($\pm 2.576\ S_{\%d}$) %	Coefficient of Variation, C_v %	Approximate 95% Confidence Limits %
		Ammonium		
Below .2	39.8	±102.5	28.1	±55.1
Between .2 → 1.0	36.0	± 92.7	25.5	±50.0
Above 1.0	17.1	± 44.0	12.1	±23.7
		Nitrates		
Below 3	10.1	± 26.0	7.1	±13.9
Above 3	8.6	± 22.2	6.1	±12.0
		Sulfates		
Below 10	9.8	± 25.2	6.9	±13.5
Above 10	7.4	± 19.1	5.2	±10.2

concentration values, considering precision only, i.e. assuming no bias. Approximate confidence limits* are computed from the following formula:

$$L_u = X\,[1 + kC_v/100] \tag{3a}$$

$$L_\ell = X\,[1 - kC_v/100] \tag{3b}$$

where L_u = upper confidence limit, $\mu g/m^3$

L_ℓ = lower confidence limit, $\mu g/m^3$

X = single reported sample value, $\mu g/m^3$

k = standard normal deviate corresponding to the desired confidence level

C_v = coefficient of variation of individual analysis values, percent

As a sample calculation, assume that an individually reported concentration for nitrate is 5.3 $\mu g/m^3$. In Table 2-2 the corresponding value for the coefficient of variation is 6.1 percent. Assuming that 95 percent confidence limits of the true value are desired, the value of k is 1.96. Substituting these data in Equation 3:

$$L_u = 5.3\,[1 + 1.96(6.1)/100] = 5.9\ \mu g/m^3 \tag{4a}$$

$$L_\ell = 5.3\,[1 - 1.96(6.1)/100] = 4.7\ \mu g/m^3 \tag{4b}$$

These limits can also be given the following interpretation. If it were possible to analyze a large number of individual strips from the same filter having a true nitrate concentration of 5.3 $\mu g/m^3$, 95 percent of such results would fall within the stated limits.

BIAS

An independent estimate of bias is obtained for nitrate and sulfate analyses through an audit program involving the analysis of strips of blank high volume filters, identical to those used for ambient air sampling, but which have been spiked with known amounts of nitrate and sulfate. The percent recovery is calculated as follows:

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*A more exact formula is presented in Appendix B.

$$\text{Percent Recovery} = \frac{\text{Analyzed Value}}{\text{Known Value}} \times 100$$

Bias is equal to the percent recovery minus 100.

The samples used for audits have been developed by the Quality Assurance Branch (QAB) of the Environmental Monitoring and Support Laboratory as part of its program for assisting analytical laboratories to improve their in-house analysis capabilities. Each lot of samples is analyzed by QAB and a corroborative laboratory before it is accepted for use in the audit program. The QAB analysis, the corroborative analysis and the attempted spike must agree to within 5% and the coefficient of variation for a spike level must be less than 2.5% or the samples are rejected. Table 2-3 presents the bias information.

The main use of the audit results is to document chronologically the precision and accuracy achieved by the analytical laboratory. QAB has found that a meaningful way to display the precision and accuracy is through mean and range control charts.

Every two weeks a set of 10 audit samples is given to the analytical laboratory to be analyzed with the ambient air samples. One blank and triplicates in a high, middle, and low range are included in each set. The analytical laboratory distributes the audit samples as evenly as possible among the analysis days during the audit period and intersperses the audit samples throughout their normal analyses of ambient air samples. Mean and range control charts are constructed and routinely used for the high level, mid-level and low level samples.

The coefficient of variation of the analytical results can be used to estimate the variability due to the extraction and analysis procedures. Nitrate analyses of audit filters had a coefficient of variation of 7.1% while the sulfate analyses had a coefficient of variation of 9.4%. These values are approximately 0.5 percent greater for nitrate ion and 3.4 percent greater for sulfate ion than corresponding values of coefficient of variation of individual analyses in Table 2-2. These differences represent the variability of cutting the sample strips and of heterogenity across the filter.

It may be assumed that the bias estimates for nitrate and sulfate were no different during the earlier years when audits were not conducted. The

TABLE 2-3. SUMMARY OF AUDIT SAMPLE PROGRAM FOR NO_3^- AND $SO_4^=$

Mean Concentration	Recovery, %	Bias, %	Standard Deviation of Recovery and Bias, %	Number of Samples
		Sulfate		
Below 10 $\mu g/m^3$	105.9	5.9	11.6	89
10 → 25 $\mu g/m^3$	95.8	-4.2	3.7	89
Above 25 $\mu g/m^3$	100.4	0.4	5.2	30
All Samples	100.8	0.8	9.4	208
		Nitrate		
Below 3 $\mu g/m^3$	101.2	1.2	7.9	91
3 → 6 $\mu g/m^3$	94.5	-5.5	4.7	96
Above 6 $\mu g/m^3$	101.3	1.3	3.8	23
All Samples	98.1	-1.9	7.1	210

Results of audit samples analyzed with 1975 NASN filters.

audits were prepared by adding known spikes to unexposed filters. The audit, then, includes variation resulting from the cutting and extraction steps of the measurement process in addition to analytical variation.

ANALYTICAL QUALITY ASSESSMENT

The precision and bias estimates discussed previously have been combined into an overall estimate of "Analytical Quality." Based on the estimates of bias and precision, an individual pollutant value (minimum, maximum or percentile) appearing in the data tables is expected to be correct (from an analysis standpoint) within the stated interval with a 95% confidence.

The approximate upper and lower confidence limits* (L_u and L_ℓ, respectively) are calculated as follows:

$$L_u = X\ (1 - B/100 + 1.96\ C_v/100) \qquad (5a)$$

$$L = X\ (1 - B/100 - 1.96\ C_v/100) \qquad (5b)$$

where X = the individual analysis value

B = bias, percent

C_v = coefficient of variation of individual analysis

For example, the maximum sulfate value for Birmingham, Alabama for 1975 was 42.0 $\mu g/m^3$. The resulting confidence limits are:

$$L_u = 42.0\ [1 - 0.4/100 + (1.96)(5.2)/100] = 46.1\ \mu g/m^3 \qquad (6a)$$

$$L_\ell = 42.0\ [1 - 0.4/100 - (1.96)(5.2)/100] = 37.6\ \mu g/m^3 \qquad (6b)$$

It is emphasized that the estimates determined by the above formulas consider only variability from sample preparation (i.e., cutting, extraction) and analysis. Further, it is assumed that the bias is constant, and that the inherent variability due to sample preparation and analysis remains unchanged. Furthermore, if additional information were known concerning variation due to factors such as the flow rate or other variables of sampling, then these confidence intervals would be wider. As a result, all confidence limits are under-estimates of the total variability of the total measurement process, including sampling and analysis.

---

*A more exact equation is presented in Appendix B.

Estimates of the bias and the 95 percent limits of precision for the period 1971 through 1975 are summarized in Table 2-4.

TABLE 2-4. ANALYTICAL PRECISION AND BIAS

Ion	Year	Concentration Range, $\mu g/m^3$	Bias Percent	Precision ($\pm 1.96\ C_v$) Percent
Ammonium	1971-1974	<0.05	Not Determined	±112
	1971-1974	0.05→0.6		± 47
	1971-1973	≥0.6		± 26
	1974	>0.6		± 12
	1975	<0.2		± 55.1
	1975	0.2→1.0		± 50.0
	1975	>1.0		± 23.7
Nitrate	1971-1973	All	- 6.7	± 16
	1974	All	- 6.7	± 12
	1975	<3	1.2	± 13.9
	1975	3→6	- 5.5	± 12.0
	1975	>6	1.3	± 12.0
Sulfate	1971-1974	<3.0	-18.0	± 10
	1971-1974	≥3.0	- 6.3	± 10
	1975	<10	5.9	± 13.5
	1975	10→25	- 4.2	± 10.2
	1975	>25	0.4	± 10.2

SECTION 3

LABORATORY METHODS

SAMPLING PROCEDURE

The mass of particulate matter per volume of air was determined by weighing a filter before and after sampling, and measuring the sample air flow rate. Air was drawn through a preweighed glass-fiber filter with a high volume air sampler.

The sample air flow rate was set at approximately 1.7 cubic meters per minute, or approximately 2500 cubic meters of air during the 24-hour sampling period. A calibrated rotameter was read at the beginning and end of the sampling period, and the average value was used to obtain the average sample flow rate. Using the sampling time (24 hours) and the measured flow rate the total sample volume of air was determined.

The filters, 20.3 by 25.4 cm, were made of flash-fired glass-fiber selected for low and uniform background concentrations of the pollutants to be measured. To eliminate filters having pinholes, creases, or other flaws that could affect air flow, the filters were visually screened for imperfections by placing each filter in front of a beam of light. Prior to the initial weighing, the filters were equilibrated for a minimum of 24 hours at a temperature of 24° Centigrade and a relative humidity of 50 percent or less. A balance scale was used that permitted weighing the filters without bending them.

The filters are then distributed unfolded to the cooperating local agencies for the urban sites and to the designated participant responsible for operating the nonurban site. After sampling, the filters are folded in half with the collected particulate matter inside and returned to the laboratory. The filter with the collected particulates is again equilibrated for at least 24 hours at a temperature of 24° Centigrade and a relative humidity of 50 percent or less, and then weighed to determine the amount of particulate

matter that was collected. These suspended particulate mass values are sent to the National Aerometric Data Bank (NADB) on a routine basis and the filters are sent to the Filter Bank for further analyses.

NONMETALLIC ION ANALYSIS PROCEDURE

The analysis for inorganic ions during 1975 was performed by Northrop Services, Incorporated, under contract no. 68-02-2566. This included the analysis of blank filters, duplicate strips, and the routine sample filters. Previously, the analytical work was performed by EMSL.

Analyses for ammonium, nitrate, and sulfate ions were performed with autoanalyzers on an aqueous extract of an 8.3 percent section of the particulate filter, i.e., a 1.9 cm strip was cut across the fold. The filter section was washed twice to obtain the final volume of 50 milliliters. This single solution was used for the three analyses. The most effective wave length for determining color for each pollutant was used. Color values were converted to concentration values in units of $\mu g/m^3$.

The analysis procedure for each ion is as follows:

1. The ammonium ions extracted from the exposed filters are analyzed by reacting them with sodium phenolate and sodium hypochlorite to produce a blue-colored complex. The reaction is pH dependent; thus, below a pH of 7.0, no color is produced. The color of the complex is determined colorimetrically at a wavelength of 625-630 nanometers.

2. The extract with water is analyzed for nitrate ion by reduction of the nitrate to nitrite by a copperized-cadmium reduction column. The nitrite is reacted with sulfanilamide in acidic solution to form a diazo compound. This compound then couples with N-1-Naphthylenediamine dihydrochloride to form a reddish-purple azo dye which is determined colorimetrically at a wavelength of 520-540 nanometers.

3. The extract is analyzed for sulfate ion by the methylthymol blue (MTB) method using a single channel Technicon Autoanalyzer II system equipped with a linearizer. The MTB method is based on the spectral difference which exists in basic solution (pH 12.5-13.0), between the barium complex of MTB and the free MTB. At this pH the barium complex is blue and free MTB is brownish-red (absorbs light at 460 nm). Thus, the color of solutions containing both the free MTB and the complex appears as gray. The amount of

free MTB, monitored colorimetrically at wavelengths of 460-480 nanometers, is the measure of the amount of sulfate in the sample.

SECTION 4

NATIONAL SUMMARY OF AIR QUALITY MEASUREMENTS

The data in Tables 4-1 and 4-2 are cumulative frequency distributions by ion of individual results by year for urban and nonurban locations, respectively. Consider, for example, the first line in Table 4-1. The number, 3909, is the number of valid 24-hour samples analyzed for ammonium in 1971. The next entry is the minimum value detected that year and "LD" means the minimum detectable level of the instrument. The next seven entries are the 10 through 99 percentile values. For example the 90 percentile value of 0.73 indicates that 90 percent of the 3909 values were equal to or less than 0.73 $\mu g/m^3$. The next entry is the maximum annual value. The arithmetic mean and standard deviation, and the geometric mean and geometric standard deviation are presented in the last four columns in the table. Comparison among years for a given pollutant provides a relative indication of trends.

Since typical levels of these pollutants, especially sulfates, may be geographically dependent, the national frequency distribution is not helpful for judging the localized contribution and relative severity of these pollutants for an individual site. Therefore, local site analyses should be performed with data from surrounding sites within the same general geographical area. Data for each site are presented in Section 5. Also of consideration is that some of the variability from year to year in the national summary tables may be attributed to different sets of sites being used in the summarization depending upon the completeness criteria for valid data as described in Section 5.

TABLE 4-1. URBAN NATIONAL CUMULATIVE FREQUENCY DISTRIBUTIONS

Ion	Year	Number of Samples	Min.	Percent of time concentration ($\mu g/m^3$) is equaled or exceeded							Max.	Arithmetic statistics		Geometric statistics	
				10	30	50	70	90	95	99		Mean	Std. dev.	Mean	Std. dev.
NH_4^+	1971	3909	LD	0.01	0.03	0.05	0.15	0.73	1.23	3.07	12.72	0.27	0.69	0.10	4.14
	1972	5512	LD	LD	0.01	0.03	0.09	0.59	1.20	3.28	13.91	0.24	0.72	0.08	4.57
	1973	4778	LD	0.01	0.01	0.06	0.17	0.73	1.37	3.82	15.50	0.30	0.79	0.11	4.23
	1974	4584	LD	0.01	0.02	0.09	0.34	1.36	2.26	5.79	15.30	0.49	1.12	0.20	3.85
	1975	4113	0.20	0.20	0.20	0.20	0.20	1.13	2.18	5.73	13.65	0.55	1.06	0.25	3.48
NO_3^-	1971	3900	LD	0.69	1.55	2.29	3.22	5.02	6.48	11.85	26.17	2.77	2.30	2.13	2.06
	1972	5519	LD	0.66	1.58	2.47	3.55	5.90	7.88	13.50	24.99	3.05	2.61	2.32	2.10
	1973	4775	LD	0.81	1.71	2.58	3.65	6.24	8.31	14.61	37.36	3.25	2.87	2.44	2.13
	1974	4562	LD	0.83	1.74	2.54	3.63	6.46	8.62	17.50	54.89	3.36	3.40	2.36	2.32
	1975	4113	0.20	0.96	2.00	2.91	4.12	7.18	9.90	17.07	33.71	3.73	3.31	2.79	2.15
$SO_4^=$	1971	3916	LD	3.4	5.7	8.0	10.9	18.0	22.0	33.5	69.2	9.6	6.8	7.84	1.89
	1972	5519	LD	3.9	6.7	9.4	12.7	20.3	25.4	37.9	75.9	11.1	7.7	9.15	1.87
	1973	4774	LD	3.9	6.3	8.1	10.9	17.5	22.7	35.4	162.0	9.9	7.0	8.06	1.89
	1974	4564	LD	3.9	6.3	8.3	11.3	17.9	22.8	34.8	69.1	10.0	6.7	8.34	1.83
	1975	4110	0.20	3.5	6.1	8.3	11.5	18.1	23.8	35.8	72.6	10.0	7.0	8.22	1.88

TABLE 4-2. NONURBAN NATIONAL CUMULATIVE FREQUENCY DISTRIBUTIONS

Ion	Year	Number of Samples	Min.	Percent of time concentration ($\mu g/m^3$) is equaled or exceeded							Max.	Arithmetic statistics		Geometric statistics	
				10	30	50	70	90	95	99		Mean	Std. dev.	Mean	Std. dev.
NH_4^+	1971	569	LD	0.01	0.02	0.04	0.05	0.17	0.44	1.25	3.19	0.10	0.28	0.03	4.31
	1972	929	LD	LD	0.01	0.01	0.01	0.10	0.25	1.57	6.12	0.07	0.32	0.02	5.68
	1973	832	LD	0.01	0.01	0.01	0.03	0.23	0.80	3.16	7.80	0.17	0.65	0.04	5.28
	1974	706	LD	0.01	0.01	0.01	0.05	0.37	1.12	2.61	9.64	0.19	0.62	0.05	4.85
	1975	630	0.20	0.20	0.20	0.20	0.20	0.20	0.64	6.14	8.85	0.34	0.79	0.13	3.92
NO_3^-	1971	671	LD	0.06	0.31	0.71	1.20	2.19	2.67	3.81	6.04	0.95	0.92	0.68	2.26
	1972	928	LD	LD	0.15	0.50	1.01	2.08	2.59	4.19	6.59	0.79	0.92	0.52	2.52
	1973	831	LD	0.04	0.28	0.71	1.26	2.35	2.83	4.47	6.67	0.99	1.02	0.69	2.34
	1974	706	LD	0.12	0.37	0.83	1.37	2.52	3.16	5.13	6.65	1.10	1.07	0.79	2.25
	1975	630	0.20	0.20	0.20	0.73	1.41	2.74	3.28	4.85	11.85	1.13	1.16	0.78	2.35
$SO_4^=$	1971	686	0.4	1.5	3.0	4.7	7.2	11.8	15.5	23.6	35.4	6.0	4.9	4.7	2.03
	1972	929	LD	1.4	2.9	5.2	7.8	13.7	17.4	24.8	42.7	6.6	5.4	5.1	2.05
	1973	831	LD	1.3	2.7	4.4	6.3	12.0	17.0	29.8	53.2	6.0	5.9	4.2	2.29
	1974	706	0.1	1.4	2.6	4.8	7.2	12.2	16.6	27.0	90.0	6.2	6.2	4.4	2.30
	1975	630	0.2	0.7	2.1	4.0	6.4	11.6	15.2	28.7	48.3	5.5	5.7	3.8	2.36

SECTION 5

DATA TABLES

The data are arranged by urban and nonurban sites. Each monitoring site is assigned a unique code number as described in the SAROAD Station Coding Manual.*

The data are presented in the same format as that described previously for the national summaries. Values are expressed in micrograms of pollutant per cubic meter of air at standard temperature (25° Centigrade) and standard pressure (760 mm mercury). Data are judged to be valid (representative) if there were at least five valid samples obtained each quarter of the year. In addition, when no samples were collected during a month of a quarter, at least two valid samples must have been collected during the other two months. In order to provide a more comprehensive data summary, some data which are not valid, as identified by an asterisk following the year, are presented if three conditions are satisfied, namely:

1. A total of at least 15 samples were collected that year
2. Data for at least two quarters were valid
3. At least one sample was obtained in each of the other two quarters

The minimum detectable concentrations for the three nonmetallic inorganic ions are presented in Table 2-1. Values below this analytical limit of discrimination are reported as "LD's" in the data tables, and a yearly mean is calculated by replacing the LD's with a value equal to one-half the value of the LD. If more than 25 percent of the individual values during a year are below the analytical discrimination value, the summary statistics are not calculated. When more than 50 percent of the individual results during a year are below the analytical discrimination value, only the minimum, maximum and number of results above the LD are shown.

*Fair, D.H. SAROAD Station Coding Manual. U.S. Environmental Protection Agency, Office of Air Programs, Research Triangle Park, North Carolina Publication No. APTD-0907. February 1972.

Data table headings present the bias and precision information from Table 2-4. For example, the headings for sulfate include the following:

Analytical Quality Conc. Range ($\mu g/m^3$)	95% Confidence Bias (%)	Precision (%)
<10	5.9	+13.5
10-25	-4.2	+10.2
>25	0.4	+10.2

The bias and precision values can be used in equations (5a) and (5b) to compute upper and lower 95 percent confidence limits on the true concentration for a given reported concentration. For example, the confidence limits for a reported sulfate concentration of 8.4 $\mu g/m^3$ would be:

$$L_u = X(1-B/100 + 1.96\ C_v/100) \qquad (5a)$$

$$= 8.4(1-5.9/100 + 13.5/100)$$

$$= 9.0\ \mu g/m^3$$

$$L_\ell = X(1-B/100 - 1.96\ C_v/100) \qquad (5b)$$

$$= 8.4(1-5.9/100 - 13.5/100)$$

$$= 6.8\ \mu g/m^3$$

Thus, the interval between 6.8 $\mu g/m^3$ and 9.0 $\mu g/m^3$ would be expected to include the true value with a confidence of 95 percent.

POLLUTANT - 12301 - AMMONIUM
METHOD - 92 - HI-VOL SODIUM PHENOLATE
UNITS - 01 - UG/CU METER (25 C)

URBAN

NH4

ANALYTICAL QUALITY

CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
< 0.2		+- 55.1
0.2-1.0		+- 50.0
> 1.0		+- 23.7

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
ALABAMA BIRMINGHAM 010380003A01	75*	23	LD	LD	LD	LD	LD	.05	.07	.26	.56	1.81	6.96				
GADSDEN 011480001A01	75*	20	LD	LD	LD	LD	LD	LD	.07	.21	.44	.52	1.79				
HUNTSVILLE 011860001A01	75*	19	LD	NO. OF SAMPLES (10) BELOW MIN. DET. EXCEEDS 50%									.98				
MOBILE 012380001A01	75	25	LD	NO. OF SAMPLES (22) BELOW MIN. DET. EXCEEDS 50%									.13				
MONTGOMERY 012460001A01	75	25	LD	NO. OF SAMPLES (15) BELOW MIN. DET. EXCEEDS 50%									5.35				
ALASKA ANCHORAGE 020040003A01	75*	26	LD	NO. OF SAMPLES (25) BELOW MIN. DET. EXCEEDS 50%									LD				
FAIRBANKS 020163001A01	75*	15	LD	NO. OF SAMPLES (12) BELOW MIN. DET. EXCEEDS 50%									.08				
ARIZONA DOUGLAS 030240004A01	75*	21	LD	NO. OF SAMPLES (11) BELOW MIN. DET. EXCEEDS 50%									.94				
PHOENIX 030600002A01	75*	17	LD	NO. OF SAMPLES (10) BELOW MIN. DET. EXCEEDS 50%									1.20				
TUCSON 030860001A01	75	25	LD	NO. OF SAMPLES (15) BELOW MIN. DET. EXCEEDS 50%									1.71				
ARKANSAS LITTLE ROCK 041440001A01	75	26	LD	NO. OF SAMPLES (15) BELOW MIN. DET. EXCEEDS 50%									3.12				
TEXARKANA 042560001A01	75*	20	LD	NO. OF SAMPLES (16) BELOW MIN. DET. EXCEEDS 50%									.14				
WEST MEMPHIS 042740001A01	75	24	LD	LD	LD	LD	LD	LD	.12	.49	.76	1.67	3.16				
CALIFORNIA ANAHEIM 050230001A01	75*	26	LD	LD	LD	LD	.05	.16	.38	.76	1.24	2.67	8.14				
BERKELEY 050740001A01	75	26	LD	NO. OF SAMPLES (22) BELOW MIN. DET. EXCEEDS 50%									.17				
BURBANK 050930002A01	75*	22	LD	LD	LD	.38	.47	.60	.86	1.09	1.50	2.25	7.12	1.170	1.64	.466	5.24
FRESNO 052800002A01	75*	26	LD	LD	LD	.06	.07	.11	.14	.25	.43	.77	6.14				
GLENDALE 052940001A01	75*	21	LD	LD	LD	.16	.31	.53	.62	1.95	2.02	3.87	7.50	1.435	2.04	.441	6.27
LONG BEACH 054100001A01	75	24	LD	LD	LD	LD	.14	.25	.53	1.01	1.66	3.18	7.24				
LOS ANGELES 054180001A01	75*	26	LD	LD	.05	.08	.29	.57	.80	1.31	2.13	2.57	4.82	1.135	1.34	.403	5.83
OAKLAND 055300001A01	75	23	LD	NO. OF SAMPLES (14) BELOW MIN. DET. EXCEEDS 50%									.93				
PASADENA 055760002A01	75*	25	LD	LD	.18	.27	.35	.54	.99	1.40	1.77	2.56	7.61	1.238	1.68	.510	4.79
SACRAMENTO 056580001A01	75	25	LD	NO. OF SAMPLES (15) BELOW MIN. DET. EXCEEDS 50%									2.37				
SAN BERNARDINO 056880001A01	75	27	LD	LD	.22	.50	.81	1.44	2.00	3.17	4.43	5.21	12.36	2.514	3.04	.954	5.91
SAN DIEGO 056900004A01	75	23	LD	LD	LD	LD	.06	.08	.15	.16	.17	.63	1.09				
SAN FRANCISCO 056860001A01	75	25	LD	NO. OF SAMPLES (18) BELOW MIN. DET. EXCEEDS 50%									1.68				
SAN JOSE 056980004A01	75	26	LD	NO. OF SAMPLES (17) BELOW MIN. DET. EXCEEDS 50%									1.90				
SANTA ANA 057180001A01	75*	23	LD	LD	LD	LD	.05	.09	.36	1.23	1.78	2.35	8.52				
TORRANCE 058260001A01	75	26	LD	LD	LD	.08	.09	.12	.57	.81	1.57	1.98	5.71	.875	1.37	.239	5.98
COLORADO DENVER 060580001A01	75*	15	LD	NO. OF SAMPLES (9) BELOW MIN. DET. EXCEEDS 50%									.19				
DENVER 060580002A01	75*	26	LD	NO. OF SAMPLES (16) BELOW MIN. DET. EXCEEDS 50%									.20				

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12301 - ARROLOR
METHOD - 92 - HI-VOL SODIUM PHENOLATE
UNITS - 03 - UG/CU METER (25 C)

U R B A N

A N A

ANALYTICAL QUALITY 95% CONF.
CONC. RANGE BIAS PRECISION
(UG/M3) (%) (%)
< 0.2 +- 55.1
0.2-1.0 +- 30.0
> 1.0 +- 23.7

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
CONNECTICUT																	
BRIDGEPORT																	
070060001A01	75	24	LD	LD	LD	LD	.08	.11	.17	.29	.39	.81	1.40				
HARTFORD																	
070420002A01	75	27	LD	LD	LD	LD	.06	.20	.32	.38	.82	.97	1.55				
NEW HAVEN																	
070700001A01	75	27	LD	LD	LD	.05	.10	.12	.18	.31	.44	.69	.84	.251	.26	.133	3.43
WATERBURY																	
071240001A01	75	27	LD	LD	LD	LD	.05	.12	.15	.20	.40	.64	.79				
DELAWARE																	
NEWARK																	
080140001A01	75	24	LD	LD	LD	LD	.07	.11	.17	.47	.73	1.32	5.50				
WILMINGTON																	
080260002A01	75*	19	LD	LD	.05	.13	.20	.22	.22	.24	.36	.66	6.19	.562	1.38	.193	3.91
FLORIDA																	
JACKSONVILLE																	
101960002A01	75*	26	LD	NO. OF SAMPLES (23) BELOW MIN. DET. EXCEEDS 50%									LD				
MIAMI																	
102700002A01	75*	21	LD	NO. OF SAMPLES (20) BELOW MIN. DET. EXCEEDS 50%									LD				
ST PETERSBURG																	
103980002A01	75*	23	LD	NO. OF SAMPLES (21) BELOW MIN. DET. EXCEEDS 50%									LD				
GEORGIA																	
ATLANTA																	
110200001A01	75	25	LD	NO. OF SAMPLES (14) BELOW MIN. DET. EXCEEDS 50%									6.70				
COLUMBUS																	
111280001A01	75	26	LD	NO. OF SAMPLES (19) BELOW MIN. DET. EXCEEDS 50%									6.38				
SAVANNAH																	
114530001A01	75	26	LD	NO. OF SAMPLES (17) BELOW MIN. DET. EXCEEDS 50%									2.14				
HAWAII																	
HONOLULU																	
120120001A01	75	27	LD	NO. OF SAMPLES (23) BELOW MIN. DET. EXCEEDS 50%									.12				
ILLINOIS																	
CHICAGO																	
141220001A01	75*	17	LD	.16	.24	.35	.51	.68	.70	.77	1.76	2.32	4.15	1.060	1.15	.603	3.39
EAST ST LOUIS																	
142120001A01	75*	19	LD	LD	LD	LD	LD	.06	.06	.10	.16	.52	1.00				
JOLIET																	
143760001A01	75*	22	LD	LD	LD	LD	.08	.11	.13	.17	.62	.79	1.04				
MOLINE																	
145120001A01	75*	24	LD	NO. OF SAMPLES (13) BELOW MIN. DET. EXCEEDS 50%									3.17				
NORTH CHICAGO																	
145620002A01	75*	23	LD	LD	LD	LD	LD	.08	.14	.21	.50	.52	1.51				
PEORIA																	
146080001A01	75*	23	LD	LD	LD	LD	.07	.13	.19	.39	.46	.96	1.26				
ROCKFORD																	
146680001A01	75*	23	LD	LD	LD	LD	LD	.06	.08	.08	.18	.25	1.35				
ROCK ISLAND																	
146700001A01	75	23	LD	NO. OF SAMPLES (12) BELOW MIN. DET. EXCEEDS 50%									2.84				
SPRINGFIELD																	
147280001A01	75*	17	LD	LD	LD	LD	.06	.09	.11	.23	.34	.51	.70				
INDIANA																	
EAST CHICAGO																	
151180001A01	75*	23	LD	.06	.10	.13	.19	.24	.27	.30	.45	.52	1.12	.288	.24	.208	2.41
EVANSVILLE																	
153300001A01	75	23	LD	LD	LD	LD	.06	.08	.09	.11	.31	1.84	5.38				
FORT WAYNE																	
153800002A01	75*	17	LD	LD	LD	.05	.06	.16	.26	.48	.50	.87	8.91	.901	2.17	.181	5.78
GARY																	
153520001A01	75*	20	LD	LD	LD	LD	.05	.07	.13	.19	.22	.76	2.17				
HAMMOND																	
153780002A01	75	24	LD	LD	LD	LD	.05	.06	.08	.11	.55	.56	.89	1.96	.390	.55	.143	4.56
SOUTH BEND																	
156880002A01	75	27	LD	LD	LD	LD	.11	.22	.32	.50	.73	1.68	3.15				
TERRE HAUTE																	
159080001A01	75*	22	LD	LD	LD	.14	.15	.32	.48	.61	1.63	2.00	4.05	.813	1.11	.287	5.16
IOWA																	
CEDAR RAPIDS																	
166640018A01	75	22	LD	LD	LD	LD	.05	.07	.09	.12	.21	.42	.71				

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12301 - AMMONIUM
METHOD - 92 - HI-VOL SODIUM PHENOLATE
UNITS - 01 - UG/CU METER (25 C)

URBAN

N H 4

ANALYTICAL QUALITY

CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
< 0.2		+- 55.1
0.2-1.0		+- 50.0
> 1.0		+- 23.7

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
IOWA																	
DAVENPORT																	
191060001A01	75*	24	LD	NO. OF SAMPLES (16) BELOW MIN. DET. EXCEEDS 50%									1.18				
DES MOINES																	
191180001A01	75	25	LD	NO. OF SAMPLES (12) BELOW MIN. DET. EXCEEDS 50%									.24				
DUBUQUE																	
191260002A01	75*	21	LD	LD	LD	LD	LD	.06	.07	.14	.27	.85	2.05				
DUBUQUE																	
191260008A01	75*	24	LD	LD	LD	LD	LD	.05	.10	.12	.32	1.00	4.77				
WATERLOO																	
193760004A01	75	25	LD	LD	LD	LD	LD	.06	.08	.15	.17	.33	.76				
KANSAS																	
KANSAS CITY																	
171800002A01	75*	18	LD	NO. OF SAMPLES (12) BELOW MIN. DET. EXCEEDS 50%									.46				
KANSAS CITY																	
171800012A01	75	25	LD	LD	LD	LD	.09	.17	.18	.23	.27	.43	4.56				
TOPEKA																	
173560001A01	75	24	LD	NO. OF SAMPLES (19) BELOW MIN. DET. EXCEEDS 50%									2.68				
WICHITA																	
173740001A01	75*	25	LD	NO. OF SAMPLES (13) BELOW MIN. DET. EXCEEDS 50%									1.14				
KENTUCKY																	
ASHLAND																	
190080002A01	75*	23	LD	LD	LD	.09	.11	.35	1.08	1.26	3.22	8.26	13.65	2.214	3.68	.400	8.70
BOWLING GREEN																	
180320001A01	75*	20	LD	LD	LD	LD	.05	.10	.17	.28	.40	.68	1.40				
COVINGTON																	
190800001A01	75*	24	LD	LD	LD	.07	.26	.29	.32	.52	1.15	2.26	4.11	.716	1.04	.248	5.11
LOUISVILLE																	
182380002A01	75	24	LD	LD	.05	.07	.08	.10	.15	.54	.69	.79	3.84	.549	.98	.182	4.53
LOUISIANA																	
BATON ROUGE																	
190280001A01	75	22	LD	NO. OF SAMPLES (18) BELOW MIN. DET. EXCEEDS 50%									.54				
IBERVILLE PAR																	
191280002A01	75*	16	LD	NO. OF SAMPLES (14) BELOW MIN. DET. EXCEEDS 50%									.91				
NEW ORLEANS																	
192020002A01	75	23	LD	NO. OF SAMPLES (17) BELOW MIN. DET. EXCEEDS 50%									.81				
SHREVEPORT																	
192740001A01	75*	25	LD	NO. OF SAMPLES (23) BELOW MIN. DET. EXCEEDS 50%									LD				
MARYLAND																	
BALTIMORE																	
210120001A01	75*	22	LD	LD	.07	.38	.41	.46	.60	.84	.67	1.75	7.69	1.023	1.81	.430	4.34
MICHIGAN																	
DEARBORN																	
231140001A01	75*	23	LD	LD	LD	.10	.10	.16	.19	.22	.44	1.50	7.15	.706	1.59	.180	4.80
DETROIT																	
231180001A01	75	27	LD	LD	LD	LD	.13	.15	.30	.43	.65	.96	6.28				
FLINT																	
231580008A01	75*	15	LD	NO. OF SAMPLES (8) BELOW MIN. DET. EXCEEDS 50%									2.34				
GRAND RAPIDS																	
231920001A01	75	26	LD	LD	LD	LD	LD	.09	.16	.29	.54	.61	5.37				
LANSING																	
232840001A01	75*	19	LD	LD	LD	LD	.05	.08	.09	.14	.38	.88	6.21				
SAGINAW																	
234760001A01	75	27	LD	LD	LD	LD	.05	.06	.08	.22	.42	.84	4.23				
TRENTON																	
235120004A01	75*	22	LD	LD	LD	LD	LD	.09	.14	.20	.54	.92	3.57				
MINNESOTA																	
DULUTH																	
241040001A01	75*	22	LD	LD	LD	LD	LD	LD	.05	.12	.21	.43	.68				
MINNEAPOLIS																	
242260327A01	75	26	LD	NO. OF SAMPLES (14) BELOW MIN. DET. EXCEEDS 50%									.62				
ST PAUL																	
243300031A01	75*	22	LD	NO. OF SAMPLES (17) BELOW MIN. DET. EXCEEDS 50%									.64				
MISSISSIPPI																	
JACKSON																	
251260002A01	75	25	LD	NO. OF SAMPLES (15) BELOW MIN. DET. EXCEEDS 50%									1.76				

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12301 - AMMONIUM
METHOD - 92 - HI-VOL SODIUM PHENOLATE
UNITS - 07 - UG/CU METER (25 C)

URBAN

NH4

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ANALYTICAL QUALITY

CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
< 0.2		+- 55.1
0.2-1.0		+- 50.0
> 1.0		+- 23.7

SITES	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
MISSOURI ST LOUIS 264280001A01	75*	23	LD	LD	.15	.23	.34	.54	.60	.69	.91	2.25	2.66	.760	.79	.424	3.52
MONTANA HELENA 270720001A01	75*	16	LD	NO. OF SAMPLES (14) BELOW MIN. DET. EXCEEDS 50%									LD				
NEBRASKA LINCOLN 283560002A01	75*	24	LD	NO. OF SAMPLES (13) BELOW MIN. DET. EXCEEDS 50%									1.57				
NEVADA LAS VEGAS 290320001A01	75*	23	LD	NO. OF SAMPLES (17) BELOW MIN. DET. EXCEEDS 50%									.15				
RENO 290480001A01	75	27	LD	NO. OF SAMPLES (16) BELOW MIN. DET. EXCEEDS 50%									.29				
NEW HAMPSHIRE CONCORD 300120002A01	75*	17	LD	NO. OF SAMPLES (9) BELOW MIN. DET. EXCEEDS 50%									1.55				
NEW JERSEY BAYONNE 310180001A01	75*	22	LD	.05	.10	.24	.29	.30	.52	.71	1.23	1.30	9.86	.998	2.04	.396	3.66
CAMDEN 310720001A01	75*	22	LD	.05	.05	.13	.24	.45	.53	.66	1.64	1.94	6.69	.928	1.44	.356	4.56
CAMDEN CO 310740003A01	75*	20	LD	LD	LD	LD	.13	.21	.43	.52	.59	.75	1.59				
ELIZABETH 311300002A01	75	26	LD	LD	.07	.19	.23	.29	.34	.68	1.08	1.53	5.40	.850	1.38	.324	4.38
GLASSBORO 311700001A01	75*	22	LD	LD	.05	.11	.15	.22	.24	.40	.65	.87	1.05	.347	.22	.298	3.33
JERSEY CITY 312320001A01	75*	20	LD	LD	.05	.13	.20	.45	.48	.77	.93	.98	4.42	.658	.96	.297	4.15
NEWARK 313480001A01	75*	24	LD	LD	LD	.06	.23	.39	.70	1.24	1.32	2.34	5.93	.912	1.20	.309	5.06
PERTH AMBOY 314220001A01	75*	23	LD	LD	.11	.13	.22	.34	.47	.62	.91	1.34	7.38	.908	1.49	.316	4.43
TRENTON 315400001A01	75	25	LD	LD	.05	.19	.22	.25	.44	.48	.57	2.01	10.70	.970	1.21	.295	4.71
NEW YORK ALBANY 330040001A01	75	24	LD	LD	LD	.07	.23	.26	.45	.67	1.23	1.55	11.79				
BUFFALO 330660001A01	75	25	LD	LD	LD	LD	LD	.09	.07	.91	.37	2.00	5.55				
NEW YORK CITY 336600014A01	75*	22	LD	LD	.09	.14	.18	.32	.46	.56	.85	1.32	5.53	.687	1.16	.277	4.09
NIAGARA FALLS 334740001A01	75	27	LD	LD	LD	LD	.10	.23	.32	.52	.67	2.02	6.74				
ROCHESTER 335760001A01	75	24	LD	LD	LD	.06	.10	.13	.18	.50	.65	4.23	5.11	.906	1.60	.193	5.87
SYRACUSE 336820001A01	75*	18	LD	NO. OF SAMPLES (12) BELOW MIN. DET. EXCEEDS 50%									2.66				
UTICA 336990001A01	75	24	LD	NO. OF SAMPLES (13) BELOW MIN. DET. EXCEEDS 50%									.94				
YONKERS 337620001A01	75*	19	LD	LD	LD	LD	.15	.22	.25	.31	.50	.75	5.27				
NORTH CAROLINA CHARLOTTE 340700001A01	75	25	LD	LD	LD	.08	.08	.10	.12	.14	.23	.77	1.65	.251	.41	.112	3.40
DURHAM 341160001A01	75*	16	LD	.13	.18	.23	.34	.42	1.01	1.12	1.87	2.91	3.23	1.060	1.11	.543	3.84
WINSTON-SALEM 344460002A01	75	27	LD	LD	LD	LD	.03	.13	.23	.44	.74	1.34	3.50				
OHIO AKRON 360060014A01	75	25	LD	.09	.15	.21	.35	.44	.53	.65	.93	2.72	3.11	.744	.89	.394	3.49
CANTON 351000001A01	75*	20	LD	.15	.21	.45	.54	.63	.70	.75	1.34	3.51	3.68	1.074	1.18	.610	3.31

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12301 - AMMONIUM
METHOD - 92 - MI-VOL SODIUM PHENOLATE
UNITS - 01 - UG/CU METER (25 C)

URBAN
NH4

ANALYTICAL QUALITY
CONC. RANGE (UG/M3) | BIAS (%) | 95% CONF. PRECISION (%)
< 0.2 | | +- 55.1
0.2-1.0 | | +- 50.0
> 1.0 | | +- 23.7

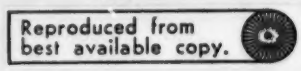
SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
OHIO																	
CINCINNATI																	
351220001A01	75	25	LD	.05	.10	.13	.28	.35	.42	.63	1.32	4.00	6.67	1.070	1.65	.376	4.69
COLUMBUS																	
351460001A01	75*	20	LD	LD	LD	.17	.20	.27	.40	.43	.63	.75	1.37	.370	.33	.234	3.55
DAYTON																	
361660001A01	75*	24	LD	LD	.09	.12	.16	.23	.32	.56	1.02	2.59	3.19	.725	.98	.274	4.67
IRONTON																	
363080001A01	75*	17	LD	LD	LD	.13	.19	.52	.55	1.14	3.60	3.20	5.71	1.361	1.77	.416	6.41
PORTSMOUTH																	
365620002A01	75*	17	LD	LD	.08	.08	.17	.19	.45	.70	1.07	1.97	5.28	.974	1.56	.309	5.17
STEUBENVILLE																	
366420012A01	75*	18	LD	LD	.05	.07	.18	.23	.46	.75	.95	1.09	1.44	.497	.48	.245	4.10
TOLEDO																	
366800001A01	75*	20	LD	LD	LD	LD	LD	.28	.33	.41	.67	.98	5.73				
YOUNGSTOWN																	
367760001A01	75	27	.13	.19	.22	.39	.55	.62	.75	.88	1.07	2.33	7.02	1.250	1.77	.713	2.66
OKLAHOMA																	
OKLAHOMA CITY																	
372230015A01	75*	25	LD	NO. OF SAMPLES (153) BELOW MIN. DET. EXCEEDS 50%									.19				
OKLAHOMA CITY																	
372200029A01	75	27	LD	NO. OF SAMPLES (180) BELOW MIN. DET. EXCEEDS 50%									.22				
TULSA																	
373000001A01	75*	22	LD	NO. OF SAMPLES (133) BELOW MIN. DET. EXCEEDS 50%									.43				
OREGON																	
PORTLAND																	
381460001A01	75*	21	LD	NO. OF SAMPLES (140) BELOW MIN. DET. EXCEEDS 50%									.45				
PENNSYLVANIA																	
ALLENTOWN																	
390120001A01	75*	24	LD	LD	.12	.14	.28	.60	.70	.94	.99	1.48	2.92	.702	.70	.368	3.84
ALTOONA																	
390140001A01	75*	15	LD	LD	.11	.14	.16	.19	.33	.70	1.49	3.41	5.46	1.101	1.64	.346	5.17
ERIE																	
393060002A01	75*	19	LD	LD	.05	.10	.16	.21	.24	.31	.42	1.20	1.74	.403	.51	.189	3.80
HAZLETON																	
393960001A01	75*	14	LD	LD	.05	.06	.13	.22	.29	.59	.71	1.33	4.29	.661	1.11	.231	4.83
PHILADELPHIA																	
397140004A01	75	26	LD	.07	.09	.12	.20	.46	.53	.64	1.00	1.03	6.27	.758	1.23	.337	3.90
PITTSBURGH																	
397260001A01	75*	24	LD	LD	.07	.14	.36	.42	.45	.89	.95	1.46	2.19	.615	.61	.297	4.33
SCRANTON																	
399040001A01	75*	12	LD	NO. OF SAMPLES (103) BELOW MIN. DET. EXCEEDS 50%									1.53				
WARMINSTER																	
399160002A01	75*	19	LD	LD	LD	.07	.15	.23	.26	.39	.51	1.16	6.34				
WEST CHESTER																	
399280110A01	75	23	LD	LD	.06	.08	.15	.24	.33	.38	.60	1.19	1.50	.427	.47	.207	3.89
WILKES-BARRE																	
399430001A01	75	24	LD	LD	LD	.09	.17	.19	.35	.60	.80	1.14	3.03	.485	.66	.200	4.48
YORK																	
399560322A01	75*	19	LD	LD	LD	LD	.05	.08	.16	.26	.71	1.45	7.31				
PUERTO RICO																	
PONCE																	
401920002A01	75*	21	LD	NO. OF SAMPLES (213) BELOW MIN. DET. EXCEEDS 50%									LD				
RHODE ISLAND																	
EAST PROVIDENCE																	
410120001A01	75*	21	LD	LD	LD	LD	LD	.10	.12	.24	.40	.42	.68	1.85			
PROVIDENCE																	
410300001A01	75*	23	LD	LD	LD	LD	.11	.16	.33	.47	.53	.59	.97	2.43			
SOUTH CAROLINA																	
COLUMBIA																	
420760001A01	75	23	LD	LD	LD	LD	LD	.08	.16	.23	.37	.59	1.36	3.02			
GREENVILLE																	
421150001A01	75	26	LD	LD	LD	LD	LD	.10	.14	.22	.28	.40	.67	2.76			
TENNESSEE																	
CHATTANOOGA																	
440380001A01	75	25	LD	LD	LD	LD	.05	.06	.08	.09	.11	.16	.33	1.52			

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12301 - AMMONIUM
METHOD - 92 - HI-VOL SODIUM PHENOLATE
UNITS - 01 - UG/CU METER (25 C)

URBAN

AMA



ANALYTICAL QUALITY

CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
< 0.2		+- 55.1
0.2-1.0		+- 30.0
> 1.0		+- 23.7

SITE:	YR	NO.	PIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
TENNESSEE																	
KNOXVILLE																	
447400020A01	75*	20	LD	NO. OF SAMPLES (19) BELOW MIN. DET. EXCEEDS 50%									1.25				
MEMPHIS																	
442340001A01	75	27	LD	LD	LD	LD	.05	.07	.09	.11	.26	.67	1.43				
NASHVILLE																	
442540001A01	75*	16	LD	NO. OF SAMPLES (10) BELOW MIN. DET. EXCEEDS 50%									.46				
TEXAS																	
AUSTIN																	
450220010A01	75*	23	LD	NO. OF SAMPLES (19) BELOW MIN. DET. EXCEEDS 50%									.27				
CORPUS CHRISTI																	
451150001A01	75*	21	LD	NO. OF SAMPLES (17) BELOW MIN. DET. EXCEEDS 50%									.11				
DALLAS																	
451310002A01	75	25	LD	NO. OF SAMPLES (14) BELOW MIN. DET. EXCEEDS 50%									.58				
EL PASO																	
451700002A01	75*	26	LD	LD	LD	LD	LD	.06	.07	.10	.26	.32	.62				
FORT WORTH																	
451880001A01	75	27	LD	NO. OF SAMPLES (20) BELOW MIN. DET. EXCEEDS 50%									.13				
HOUSTON																	
452560001A01	75	24	LD	NO. OF SAMPLES (19) BELOW MIN. DET. EXCEEDS 50%									.23				
LUBBOCK																	
453340001A01	75*	16	LD	NO. OF SAMPLES (16) BELOW MIN. DET. EXCEEDS 50%									LD				
PASADENA																	
454060002A01	75*	16	LD	NO. OF SAMPLES (14) BELOW MIN. DET. EXCEEDS 50%									.28				
SAN ANTONIO																	
454570034A01	75*	23	LD	NO. OF SAMPLES (22) BELOW MIN. DET. EXCEEDS 50%									LD				
WICHITA FALLS																	
455560002A01	75*	17	LD	NO. OF SAMPLES (13) BELOW MIN. DET. EXCEEDS 50%									.27				
UTAH																	
OGDEN																	
460680001A01	75*	23	LD	NO. OF SAMPLES (12) BELOW MIN. DET. EXCEEDS 50%									7.08				
SALT LAKE CITY																	
460920001A01	75	26	LD	LD	LD	LD	.05	.08	.16	.18	.27	.55	7.33				
VERMONT																	
BURLINGTON																	
470143003A01	75	24	LD	NO. OF SAMPLES (17) BELOW MIN. DET. EXCEEDS 50%									.90				
VIRGINIA																	
DANVILLE																	
480920001A01	75*	21	LD	LD	.06	.09	.09	.20	.40	.47	1.26	1.38	3.12	.615	.86	.235	4.41
HAMPTON																	
481440001A01	75*	25	LD	LD	LD	.09	.21	.36	.41	1.04	1.18	2.45	3.47				
LYNCHBURG																	
481840001A01	75	21	LD	LD	LD	LD	.05	.12	.33	.52	.96	1.29	3.69				
NORFOLK																	
482140001A01	75*	21	LD	LD	LD	.06	.19	.44	.61	.80	1.29	2.86	3.41	.817	1.02	.292	5.62
PORTSMOUTH																	
482440001A01	75*	15	LD	.05	.07	.21	.25	.51	.73	.85	1.10	1.76	5.56	.856	1.39	.349	4.20
RICHMOND																	
482660002A01	75*	25	LD	.08	.14	.40	.63	1.15	1.19	1.56	1.91	3.66	4.85	1.340	1.31	.703	4.01
ROANOKE																	
482700003A01	75*	22	LD	LD	LD	LD	LD	.05	.07	.14	.38	.66	1.01				
WASHINGTON																	
SEATTLE																	
491940001A01	75*	26	LD	NO. OF SAMPLES (23) BELOW MIN. DET. EXCEEDS 50%									1.24				
SPOKANE																	
492040001A01	75*	23	LD	NO. OF SAMPLES (19) BELOW MIN. DET. EXCEEDS 50%									1.29				
TACOMA																	
492940001A01	75	27	LD	NO. OF SAMPLES (22) BELOW MIN. DET. EXCEEDS 50%									.59				
WEST VIRGINIA																	
CHARLESTON																	
500280001A01	75	24	LD	LD	.05	.15	.27	.46	.59	1.15	1.53	4.52	8.57	1.565	2.20	.456	5.91
SOUTH CHARLEST																	
501760001A01	75	25	LD	.05	.08	.15	.14	.38	.50	1.17	1.24	5.66	9.21	1.712	2.70	.403	6.42
WISCONSIN																	
EAU CLAIRE																	
510940002A01	75	23	LD	NO. OF SAMPLES (17) BELOW MIN. DET. EXCEEDS 50%									.76				

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 92301 - AMMONIUM
METHOD - 92 - HI-VOL SODIUM PHENOLATE
UNITS - 09 - UG/CU METER (25 C)

URBAN
NH4

ANALYTICAL QUALITY CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
< 0.2		+- 55.1
0.2-1.0		+- 50.0
> 1.0		+- 23.7

SITE	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
WISCONSIN																	
KENOSHA																	
51154000 1A01	75*	17	LD	LD	LD	.06	.14	.16	.30	.39	1.15	1.38	3.25	.583	.87	.216	4.61
MADISON																	
51186000 1A01	75*	19	LD	LD	LD	.08	.09	.12	.15	.23	.34	.50	.62	.208	.19	.126	3.05
MILWAUKEE																	
51220000 1A01	75	24	LD	LD	LD	.08	.09	.12	.17	.34	.60	1.63	3.42	.513	.92	.165	4.47
RACINE																	
51280002 2A01	75	24	LD	LD	.05	.05	.07	.11	.11	.18	.47	1.46	2.62	.394	.64	.141	4.11
SUPERIOR																	
51348000 1A01	75*	17	LD	NO. OF SAMPLES (10) BELOW MIN. DET. EXCEEDS 50%									.31				
WYOMING																	
CASPER																	
52012000 1A01	75*	20	LD	NO. OF SAMPLES (12) BELOW MIN. DET. EXCEEDS 50%									LD				

POLLUTANT - 12301 - AMMONIUM
METHOD - 92 - HI-VOL SODIUM PHENOLATE
UNITS - 01 - UG/CU METER (25 C)

NONURBAN
NH4

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ANALYTICAL QUALITY CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
ARKANSAS														< 0.2		+- 55.1				
MONTGOMERY CO														0.2-1.0		+- 30.0				
041760001A03	75*	21	LD	NO. OF SAMPLES (17) BELOW MIN. DET. EXCEEDS 50%									.21	> 1.0		+- 23.7				
COLORADO																				
MESA VERDE NAT																				
061530002A03	75*	22	LD	NO. OF SAMPLES (22) BELOW MIN. DET. EXCEEDS 50%									LD							
FLORIDA																				
HARDEE CO																				
101630001A03	75*	22	LD	NO. OF SAMPLES (18) BELOW MIN. DET. EXCEEDS 50%									.07							
HAWAII																				
HAWAII CO																				
120080001A03	75*	20	LD	NO. OF SAMPLES (16) BELOW MIN. DET. EXCEEDS 50%									.43							
HAWAII CO																				
120090002A03	75*	22	LD	NO. OF SAMPLES (13) BELOW MIN. DET. EXCEEDS 50%									.23							
HAWAII VOLCANO																				
120090001A03	75*	14	LD	NO. OF SAMPLES (11) BELOW MIN. DET. EXCEEDS 50%									.11							
IDAHO																				
BUTTE CO																				
130340001A03	75*	23	LD	NO. OF SAMPLES (23) BELOW MIN. DET. EXCEEDS 50%									LD							
INDIANA																				
MONROE CO																				
152800001A03	75*	21	LD	LD	LD	LD	LD	.10	.11	.20	.46	.59	8.46							
MAINE																				
ACADIA NAT PAR																				
200010001A03	75*	19	LD	NO. OF SAMPLES (14) BELOW MIN. DET. EXCEEDS 50%									.68							
MARYLAND																				
CALVERT CO																				
210280001A03	75*	23	LD	LD	LD	LD	.05	.37	.43	.48	.77	1.48	6.36							
MISSISSIPPI																				
JACKSON CO																				
251280001A03	75*	26	LD	NO. OF SAMPLES (16) BELOW MIN. DET. EXCEEDS 50%									.85							
MISSOURI																				
SHANNON CO																				
264480002A03	75	24	LD	LD	LD	LD	LD	.06	.07	.11	.21	.58	1.76							
MONTANA																				
GLACIER NAT PA																				
270570001A03	75*	18	LD	NO. OF SAMPLES (19) BELOW MIN. DET. EXCEEDS 50%									LD							
POWDER RIVER C																				
271240006A03	75*	19	LD	NO. OF SAMPLES (18) BELOW MIN. DET. EXCEEDS 50%									LD							
NEBRASKA																				
THOMAS CO																				
282480001A03	75*	17	LD	NO. OF SAMPLES (16) BELOW MIN. DET. EXCEEDS 50%									LD							
NEVADA																				
WHITE PINE CO																				
290560001A03	75*	24	LD	NO. OF SAMPLES (21) BELOW MIN. DET. EXCEEDS 50%									.13							
NEW HAMPSHIRE																				
COOS CO																				
300140301A03	75*	22	LD	NO. OF SAMPLES (17) BELOW MIN. DET. EXCEEDS 50%									2.60							
NEW YORK																				
JEFFERSON CO																				
333340001A03	75*	21	LD	LD	LD	.05	.11	.15	.19	.21	.27	.73	7.09				.795	1.98	.159	4.93
RHODE ISLAND																				
WASHINGTON CO																				
410380002A03	75*	22	LD	LD	LD	LD	LD	LD	.06	.10	.20	.36	1.32							
SOUTH CAROLINA																				
PICKLAND CO																				
421900002A03	75*	26	LD	NO. OF SAMPLES (15) BELOW MIN. DET. EXCEEDS 50%									1.92							

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12301 - AMMONIUM
METHOD - 92 - HI-VOL SODIUM PHENOLATE
UNITS - 07 - UG/CU METER (25 C)

NONURBAN

NH4

ANALYTICAL QUALITY

CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
< 0.2		+- 55.1
0.2-1.0		+- 50.0
> 1.0		+- 23.7

SITE	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
SOUTH DAKOTA																	
BLACK HILLS NA																	
430910001A03	75*	22	LD	NO. OF SAMPLES (21) BELOW MIN. DET. EXCEEDS 50%									LD				
TENNESSEE																	
CUMBERLAND CO																	
440680001A03	75	27	LD	NO. OF SAMPLES (18) BELOW MIN. DET. EXCEEDS 50%									1.15				
TEXAS																	
MATAGORDA CO																	
453530001A03	75*	25	LD	NO. OF SAMPLES (22) BELOW MIN. DET. EXCEEDS 50%									.15				
TOM GREEN CO																	
455200001A03	75*	24	LD	NO. OF SAMPLES (19) BELOW MIN. DET. EXCEEDS 50%									.09				
VERMONT																	
ORANGE CO																	
470360001A03	75*	24	LD	LD	LD	LD	LD	LD	.07	.11	.15	1.67	6.50				
VIRGINIA																	
SHENANDOAH NAT																	
482890001A03	75*	19	LD	NO. OF SAMPLES (11) BELOW MIN. DET. EXCEEDS 50%									P.85				
WYTHE CO																	
483440001A03	75*	22	LD	LD	LD	LD	.05	.05	.06	.14	.43	.69	.95				
WASHINGTON																	
KING CO																	
490980002A03	75*	24	LD	NO. OF SAMPLES (23) BELOW MIN. DET. EXCEEDS 50%									LD				
WYOMING																	
YELLOWSTONE NA																	
520860001A03	75*	17	LD	NO. OF SAMPLES (16) BELOW MIN. DET. EXCEEDS 50%									LD				

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POLLUTANT - 12306 - NITRATE
METHOD - 92 - HI-VOL REDUCTION-DIAZO COUPLING
UNITS - 07 - UG/CU METER (25 C)

URBAN
NO3

ANALYTICAL QUALITY CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
< 3	1.2	+- 13.9
3-6	-5.5	+- 12.0
> 6	1.3	+- 12.0

SITE	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
ALABAMA BIRMINGHAM 010380003A01	75*	23	.21	.71	1.50	1.52	1.76	2.10	2.34	2.64	2.78	3.92	4.49	2.265	1.11	1.932	1.94
GADSDEN 011480001A01	75*	20	1.14	1.20	1.36	1.47	1.63	1.93	2.16	2.51	2.85	2.91	3.35	2.073	.69	1.961	1.41
HUNTSVILLE 011860001A01	75*	19	.82	1.23	1.82	2.06	2.14	2.25	2.28	2.55	2.83	3.52	4.06	2.389	.86	2.230	1.49
MOBILE 012380001A01	75	25	1.09	1.22	1.34	1.58	1.76	1.91	2.06	2.56	2.72	4.37	8.71	2.438	1.61	2.109	1.63
MONTGOMERY 012460001A01	75	25	LD	.53	.68	1.10	1.13	1.43	1.50	1.73	1.96	2.24	2.88	1.403	.71	1.065	2.83
ALASKA ANCHORAGE 020040003A01	75*	26	LD	.27	.41	.45	.52	.63	.71	.87	1.16	1.37	2.09	.766	.52	.570	2.58
FAIRBANKS 020160001A01	75*	15	LD	LD	LD	.16	.18	.55	.78	.80	1.11	1.48	1.65				
ARIZONA DOUGLAS 030240004A01	75*	21	LD	.15	.67	.91	.96	1.08	1.22	1.27	1.65	1.72	1.82	1.091	.49	.857	2.67
PHOENIX 030800002A01	75*	17	2.50	2.94	3.22	3.46	3.73	4.27	5.02	5.55	6.60	6.84	12.71	5.342	2.91	4.794	1.57
TUCSON 030860001A01	75	25	.96	1.27	1.57	1.82	2.23	2.45	2.62	2.88	3.39	4.27	4.76	2.569	1.08	2.352	1.54
ARKANSAS LITTLE ROCK 041440001A01	75	26	.54	1.13	1.73	2.20	2.56	2.66	2.85	3.18	3.55	3.60	4.09	2.627	.97	2.375	1.68
TEXARKANA 042560001A01	75*	20	1.50	1.55	1.96	2.32	2.42	2.51	2.61	3.01	3.24	3.36	5.57	2.707	.91	2.576	1.37
WEST MEMPHIS 042740001A01	75	24	.38	.76	1.70	1.78	2.55	2.82	3.06	3.96	4.90	6.50	7.48	3.275	1.92	2.686	2.02
CALIFORNIA ANAHEIM 050230001A01	75*	26	1.61	3.86	5.45	7.21	7.36	8.73	10.41	13.05	15.05	16.20	20.31	10.148	5.24	8.637	1.87
BERKELEY 050740001A01	75	26	.87	1.16	1.82	2.18	2.54	2.79	3.88	4.44	5.73	8.00	12.32	4.170	3.02	3.289	2.03
BURBANK 050900002A01	75*	22	4.16	5.33	5.91	7.33	8.70	9.06	10.81	11.83	15.97	16.91	18.98	10.737	4.59	9.819	1.56
FRESNO 052800002A01	75*	26	1.14	2.82	3.43	4.76	5.17	7.72	8.99	9.73	10.77	13.52	30.66	9.105	7.03	6.975	2.17
GLENDALE 052940001A01	75*	21	3.23	5.39	6.06	6.51	7.03	9.00	10.34	10.50	10.64	12.83	19.72	9.253	4.00	8.515	1.51
LONG BEACH 054100001A01	75	24	.46	1.79	3.52	5.14	5.69	5.81	6.55	8.97	11.99	15.34	20.18	7.593	4.98	5.866	2.30
LOS ANGELES 054180001A01	75*	26	2.74	4.84	6.25	9.64	10.49	12.15	12.85	16.10	17.69	18.23	23.51	12.672	5.74	11.209	1.72
OAKLAND 055300001A01	75	23	.66	.84	1.18	1.56	1.66	2.84	3.73	4.09	4.58	8.64	11.18	3.478	2.84	2.566	2.24
PASADENA 055750002A01	75*	25	2.06	3.86	3.99	6.52	7.24	8.58	10.58	12.03	12.84	14.97	30.73	9.668	5.90	8.212	1.81
SACRAMENTO 056580001A01	75	25	.20	.48	1.59	2.54	2.73	4.25	4.41	5.04	5.64	8.37	16.05	4.340	3.47	2.992	2.79
SAN BERNARDINO 056680001A01	75	27	2.97	3.60	10.34	12.53	14.03	16.17	17.53	23.03	23.77	30.57	33.71	17.331	8.80	14.585	1.95
SAN DIEGO 056800004A01	75	23	2.21	3.22	4.88	5.27	5.72	6.78	6.99	7.92	8.22	12.19	15.78	7.164	3.35	6.473	1.59
SAN FRANCISCO 056860001A01	75	25	.39	.53	.82	.95	1.62	2.46	2.83	3.36	6.35	12.11	12.64	3.870	4.03	2.281	2.95
SAN JOSE 056980004A01	75	26	.72	1.67	2.19	3.68	4.77	6.60	8.94	9.96	12.45	13.76	20.96	7.850	5.48	5.754	2.45
SANTA ANA 057180001A01	75*	23	1.73	3.17	4.50	7.04	7.40	8.36	10.49	11.53	12.51	17.08	27.96	9.990	5.92	8.362	1.90
TORRANCE 058260001A01	75	26	.23	.76	2.24	3.45	3.52	4.85	6.15	8.66	9.20	14.75	20.89	6.913	5.87	4.541	2.97
COLORADO DENVER 050580001A01	75*	15	1.11	1.47	1.96	2.25	2.42	2.49	2.58	2.99	3.02	4.79	5.18	2.741	1.07	2.555	1.47
DENVER 060580002A01	75*	26	.81	1.23	1.76	2.07	2.24	2.36	2.64	2.68	3.65	4.20	9.01	2.812	1.62	2.489	1.63

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12306 - NITRATE
METHOD - 92 - HI-VOL REDUCTION-DIAZO COUPLING
UNITS - 09 - UG/CU METER (25 C)

URBAN

NO3

ANALYTICAL QUALITY CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
< 3	1.2	+- 13.9
3-6	-5.5	+- 12.0
> 6	1.3	+- 12.0

SITE	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
CONNECTICUT																	
BRIDGEPORT																	
070060001A01	75	24	1.33	1.66	2.12	2.26	2.87	3.01	3.83	4.81	5.28	7.15	9.99	3.977	2.20	3.665	1.70
HARTFORD																	
070420002A01	75	27	.72	1.02	1.76	2.27	3.07	3.87	3.90	4.26	4.80	5.21	6.55	3.465	1.58	3.018	1.80
NEW HAVEN																	
070700001A01	75	27	1.12	1.79	2.22	2.66	2.71	3.07	4.25	4.93	5.62	6.36	9.90	3.956	2.08	3.655	1.71
WATERBURY																	
071240001A01	75	27	.88	1.71	1.76	2.40	2.80	3.72	4.23	5.10	5.92	7.59	8.25	4.079	2.25	3.652	1.85
DELAWARE																	
NEWARK																	
080140001A01	75	24	.40	1.29	1.85	2.23	2.84	2.88	2.94	3.40	4.33	5.03	5.36	3.021	1.31	2.675	1.76
WILMINGTON																	
080260002A01	75*	19	.23	1.46	2.64	3.03	3.35	4.03	4.05	4.12	4.60	4.67	6.35	3.634	1.41	3.142	2.04
FLORIDA																	
JACKSONVILLE																	
101960002A01	75*	26	.88	1.38	1.57	1.75	2.00	2.13	2.30	2.70	2.93	3.15	4.32	2.286	.79	2.151	1.44
MIAMI																	
102700002A01	75*	21	.47	.70	.79	.96	1.17	1.73	1.95	2.20	2.45	2.89	3.23	1.723	.85	1.503	1.75
ST PETERSBURG																	
103980002A01	75*	23	.13	.35	1.27	1.51	2.01	2.40	2.94	3.26	3.95	5.21	5.38	2.610	1.56	1.937	2.67
GEORGIA																	
ATLANTA																	
110200001A01	75	25	.07	1.26	1.47	1.55	1.94	2.08	2.55	2.89	2.92	4.17	4.34	2.334	1.06	1.957	2.22
COLUMBUS																	
111280001A01	75	26	.08	.28	.41	.59	1.10	1.38	1.44	1.51	1.77	1.91	2.92	1.256	.73	.971	2.35
SAVANNAH																	
114500001A01	75	26	.07	.41	.74	1.49	1.71	2.19	2.54	2.87	3.20	3.39	6.65	2.274	1.45	1.686	2.63
HAWAII																	
HONOLULU																	
120120001A01	75	27	LD	.11	.14	.21	.24	.29	.32	.35	.43	.48	.83	.304	.16	.253	2.02
ILLINOIS																	
CHICAGO																	
141220001A01	75*	17	1.12	1.78	3.08	3.44	4.35	5.20	5.38	6.19	6.73	7.55	10.70	5.231	2.54	4.579	1.77
EAST ST LOUIS																	
142120001A01	75*	19	.78	2.16	2.42	2.50	2.66	2.83	3.50	3.58	4.07	5.84	9.69	3.652	2.02	3.212	1.69
JOLIET																	
143760001A01	75*	22	1.67	2.22	2.92	3.23	3.44	3.81	3.91	4.38	5.15	6.15	9.05	4.230	1.83	3.902	1.50
MOLINE																	
145120001A01	75*	24	.65	2.18	3.22	3.55	3.95	4.46	4.62	4.75	5.28	6.90	11.14	4.548	2.00	4.094	1.68
NORTH CHICAGO																	
145620002A01	75*	23	.28	.83	1.93	2.28	3.27	3.84	3.87	4.66	4.97	5.78	12.83	3.966	2.52	3.075	2.19
PEORIA																	
145080001A01	75*	23	1.43	1.72	2.22	2.99	3.30	3.96	4.45	5.33	6.06	7.43	9.06	4.445	2.30	3.887	1.71
ROCKFORD																	
146660001A01	75*	23	2.09	2.15	2.63	3.39	3.93	4.33	4.41	4.69	5.14	6.95	12.40	4.666	2.38	4.220	1.55
ROCK ISLAND																	
146700001A01	75	23	1.51	2.55	3.33	3.53	4.36	4.86	5.02	5.46	6.33	8.74	11.02	5.146	2.26	4.698	1.56
SPRINGFIELD																	
147280001A01	75*	17	2.35	2.92	3.17	3.33	3.91	4.11	4.45	4.68	4.93	4.94	5.69	4.139	.91	4.036	1.26
INDIANA																	
EAST CHICAGO																	
151180001A01	75*	23	2.32	2.40	3.53	4.19	4.29	5.29	5.44	6.77	7.69	10.39	19.65	6.221	3.81	5.428	1.66
EVANSVILLE																	
151300001A01	75	23	.74	1.06	1.79	2.24	2.64	3.02	3.30	3.97	4.05	4.54	5.82	3.070	1.36	2.729	1.70
FORT WAYNE																	
151360002A01	75*	17	2.28	2.41	2.61	3.34	3.62	4.72	5.42	5.92	6.88	8.76	12.72	5.305	2.90	4.676	1.66
GARY																	
151520001A01	75*	20	4.07	4.42	4.54	5.10	6.12	6.36	7.13	7.37	10.29	12.30	14.64	7.561	3.22	6.995	1.48
HAMMOND																	
151780002A01	75	24	.05	.93	2.43	3.06	3.32	3.86	4.23	5.63	5.76	7.52	10.97	4.484	2.62	3.381	2.87
SOUTH BEND																	
153880002A01	75	27	.41	1.66	2.28	2.88	3.47	3.97	4.08	4.78	5.07	7.75	11.88	4.386	2.65	3.649	1.95
TERRE HAUTE																	
154080001A01	75*	22	.70	1.32	3.01	3.57	4.18	4.49	4.91	5.27	6.54	7.31	9.68	4.756	2.12	4.179	1.80
IOWA																	
CEDAR RAPIDS																	
150640078A01	75	22	.39	2.67	2.80	3.31	3.46	3.55	4.47	5.03	6.07	7.08	13.94	4.708	2.73	3.988	1.94

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12306 - NITRATE
METHOD - 92 - HI-VOL REDUCTION-DIAZO COUPLING
UNITS - 01 - UG/CU METER (25 C)

U R B A N

N O 3

ANALYTICAL QUALITY CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
< 3	1.2	+- 13.9
3-6	-5.5	+- 12.0
> 6	1.3	+- 12.0

SITE	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
IOWA																	
DAVENPORT 161060001A01	75*	24	2.06	2.26	3.46	3.72	4.53	5.00	5.85	6.14	6.36	8.79	15.04	5.519	2.75	4.985	1.57
DES MOINES 151180001A01	75	25	.51	1.41	1.76	2.79	2.92	3.47	3.52	3.87	4.33	7.64	12.88	4.000	2.74	3.250	1.98
DUBUQUE 161260002A01	75*	21	.44	.48	1.06	1.95	2.14	2.39	2.79	3.79	4.55	5.57	8.03	3.011	1.99	2.355	2.18
DUBUQUE 151260008A01	75*	24	.61	1.03	1.70	1.82	2.58	2.67	2.76	3.57	3.67	5.76	10.08	3.159	2.07	2.637	1.85
WATERLOO 163760004A01	75	25	.86	2.16	2.44	3.48	3.52	3.62	3.97	4.24	4.29	9.06	10.45	4.270	2.31	3.763	1.68
KANSAS																	
KANSAS CITY 171800002A01	75*	18	1.24	1.35	2.08	2.34	2.70	2.96	3.38	3.55	3.60	4.13	9.11	3.438	1.95	3.043	1.63
KANSAS CITY 171800012A01	75	25	1.56	2.07	2.69	3.35	3.49	3.90	3.97	4.32	4.88	8.21	9.40	4.231	2.06	3.821	1.58
TOPEKA 173560001A01	75	24	.93	1.09	1.49	1.81	2.17	2.21	2.32	2.75	3.17	3.63	11.07	2.652	1.95	2.292	1.65
WICHITA 173740001A01	75*	25	.57	1.24	1.42	2.04	2.25	2.51	2.69	3.05	3.26	3.49	7.52	2.644	1.44	2.321	1.70
KENTUCKY																	
ASHLAND 190080002A01	75*	23	.46	.57	.73	.99	1.34	1.93	2.10	2.34	3.19	3.55	3.88	1.973	1.12	1.627	1.96
BOWLING GREEN 180520001A01	75*	20	.57	1.11	1.51	2.08	2.56	2.98	3.06	3.22	3.44	3.91	4.48	2.718	1.02	2.469	1.65
COVINGTON 180800001A01	75*	24	.56	1.09	1.69	1.90	2.50	2.53	2.78	3.25	3.42	4.71	8.22	2.924	1.62	2.541	1.75
LOUISVILLE 182380002A01	75	24	1.60	1.66	2.17	2.27	2.58	2.74	2.91	3.02	3.33	4.30	4.74	2.884	.86	2.767	1.34
LOUISIANA																	
BATON ROUGE 190280001A01	75	22	.89	.95	1.26	1.45	1.50	1.52	1.67	2.19	2.44	2.88	6.67	2.007	1.20	1.796	1.56
IBERVILLE PAR 191280002A01	75*	18	1.05	1.76	1.86	1.91	2.26	2.35	2.98	2.99	3.69	4.45	4.68	2.904	1.06	2.605	1.49
NEW ORLEANS 192020002A01	75	23	1.88	2.04	2.28	2.49	2.65	2.79	3.24	3.52	4.20	4.89	5.70	3.233	1.09	3.071	1.38
SHREVEPORT 192740001A01	75*	25	.89	1.38	1.68	1.78	1.86	2.10	2.20	2.46	2.90	3.22	5.11	2.259	.87	2.117	1.43
MARYLAND																	
BALTIMORE 210120001A01	75*	22	1.20	1.99	2.49	2.90	3.40	3.59	3.75	4.36	5.54	6.33	7.78	3.964	1.63	3.646	1.53
MICHIGAN																	
DEARBORN 231940001A01	75*	23	.25	1.64	2.42	3.22	4.48	4.94	5.92	6.24	7.35	8.68	18.23	5.871	4.00	4.491	2.40
DETROIT 231180001A01	75	27	.78	1.54	2.66	3.33	3.80	4.25	4.42	5.26	7.07	8.46	14.67	5.135	3.36	4.212	1.94
FLINT 231580008A01	75*	15	.67	1.18	1.95	2.94	2.99	4.71	5.11	5.29	5.50	8.16	8.25	4.299	2.39	3.527	2.06
GRAND RAPIDS 231920001A01	75	26	.52	1.45	2.35	2.62	2.87	3.15	4.01	4.24	5.55	7.81	13.14	4.420	3.19	3.523	2.02
LANSING 232840001A01	75*	19	.66	1.71	2.26	3.11	3.61	3.84	3.91	4.83	5.75	7.00	15.73	4.924	3.58	3.852	2.02
SAGINAW 234760001A01	75	27	.66	1.17	1.93	2.24	3.04	3.52	4.39	4.87	6.92	7.61	16.53	4.525	3.39	3.510	2.12
TRENTON 235120004A01	75*	22	1.16	1.78	2.10	2.86	3.83	3.91	4.51	5.12	5.60	6.27	17.02	4.618	3.23	3.902	1.78
MINNESOTA																	
DULUTH 241040001A01	75*	22	.65	.73	.84	.95	.99	1.10	1.61	1.65	3.44	4.14	10.30	2.202	2.22	1.602	2.14
MINNEAPOLIS 242260027A01	75	26	.39	1.07	1.49	1.71	1.84	2.21	3.00	3.31	5.37	6.47	10.87	3.375	2.77	2.501	2.24
ST PAUL 243300031A01	75*	22	.21	.22	.71	1.43	1.62	1.88	2.36	3.58	4.77	7.28	10.76	3.016	2.71	1.945	2.88
MISSISSIPPI																	
JACKSON 251260002A01	75	25	.72	.75	1.10	1.49	1.59	1.80	1.82	2.21	2.58	2.98	3.35	1.973	.78	1.704	1.58

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12306 - NITRATE
METHOD - 92 - HI-VOL REDUCTION-DIAZO COUPLING
UNITS - 01 - UG/CU METER (25 C)

URBAN
NO3

ANALYTICAL QUALITY CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
< 3	1.2	+- 13.9
3-6	-5.5	+- 12.0
> 6	1.3	+- 12.0

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
MISSOURI ST LOUIS 264280001A01	75*	23	.83	.88	1.49	1.62	1.96	3.50	3.86	4.23	4.58	6.04	16.01	3.784	3.30	2.867	2.14
MONTANA HELENA 270720001A01	75*	16	.13	.22	.25	.31	.36	.62	.71	.71	.85	.99	3.27	.761	.75	.553	2.22
NEBRASKA LINCOLN 281560002A01	75*	24	.93	.93	1.58	1.62	1.82	2.25	2.88	3.19	3.61	8.71	10.94	3.323	2.74	2.584	1.99
NEVADA LAS VEGAS 290320001A01	75*	23	.55	1.01	1.58	2.06	2.31	2.57	2.87	3.30	3.46	4.59	5.06	2.708	1.19	2.412	1.70
RENO 290480001A01	75	27	.39	.48	1.03	1.32	1.63	1.91	1.98	2.59	2.81	3.01	6.77	2.150	1.47	1.740	1.99
NEW HAMPSHIRE CONCORD 300120002A01	75*	17	.38	.51	.62	.91	.94	1.13	1.18	1.33	2.34	2.69	4.12	1.476	1.07	1.199	1.91
NEW JERSEY BAYONNE 310180001A01	75*	22	1.34	1.65	1.92	2.39	2.62	3.05	3.75	4.06	5.38	6.10	6.48	3.578	1.64	3.219	1.61
CAMDEN 310720001A01	75*	22	.93	1.48	1.71	3.03	3.74	3.99	4.52	5.14	5.52	6.40	8.09	4.148	1.97	3.626	1.77
CAMDEN CO 310740003A01	75*	20	.64	1.12	1.77	2.47	2.91	3.34	3.55	3.73	4.43	5.31	6.55	3.381	1.60	2.955	1.78
ELIZABETH 311300002A01	75	26	.90	1.16	1.52	2.24	3.09	3.22	3.64	4.21	4.77	4.96	7.37	3.393	1.61	2.970	1.75
GLASSBORO 311700001A01	75*	22	1.47	1.50	1.83	2.50	3.05	3.39	3.43	4.06	4.38	5.34	8.33	3.517	1.71	3.162	1.60
JERSEY CITY 312320001A01	75*	20	1.17	1.54	2.07	2.34	2.77	3.17	4.71	5.34	5.62	6.05	8.67	4.037	2.04	3.524	1.74
NEWARK 313480001A01	75*	24	1.07	1.64	2.35	2.48	3.14	3.49	3.79	5.03	7.09	8.30	8.83	4.354	2.40	3.759	1.75
PERTH AMBOY 314220001A01	75*	23	.16	.41	1.62	1.73	2.29	2.85	3.15	3.33	3.65	4.19	5.13	2.665	1.36	2.139	2.28
TRENTON 315400001A01	75	25	.44	1.05	1.82	2.55	2.61	3.12	3.41	3.86	4.21	5.04	6.50	3.116	1.50	2.663	1.90
NEW YORK ALBANY 330040001A01	75	22	.27	.44	.54	1.22	1.52	1.82	2.22	2.78	3.16	3.96	7.77	2.308	1.84	1.659	2.44
BUFFALO 330660001A01	75	25	.14	.59	1.81	2.52	2.65	3.46	3.75	4.51	4.57	4.96	6.30	3.197	1.64	2.471	2.52
NEW YORK CITY 334680014A01	75*	22	1.53	1.64	2.56	3.00	3.83	5.22	5.74	6.12	6.51	8.40	9.34	4.981	2.37	4.370	1.74
NIAGARA FALLS 334740001A01	75	27	1.16	1.74	2.16	2.30	2.89	3.05	3.08	3.75	4.37	4.81	10.11	3.404	1.74	3.071	1.57
ROCHESTER 335760001A01	75	24	.33	.43	1.53	1.62	2.06	2.64	3.32	4.03	4.95	7.30	7.69	3.342	2.31	2.465	2.44
SYRACUSE 336200001A01	75*	18	.77	1.17	1.96	2.35	3.02	3.14	3.83	4.52	5.01	6.32	9.16	3.918	2.29	3.291	1.89
UTICA 336880001A01	75	24	.72	.73	2.03	2.77	3.17	4.19	4.24	4.67	5.18	5.78	6.71	3.787	1.68	3.301	1.82
YONKERS 337620001A01	75*	19	.78	1.80	2.45	2.73	3.17	4.24	4.37	4.54	5.25	6.07	10.49	4.231	2.22	3.684	1.77
NORTH CAROLINA CHARLOTTE 340700001A01	75	25	.38	.70	1.33	1.68	1.87	2.01	2.20	2.40	2.44	2.79	3.95	1.972	.81	1.760	1.72
DURHAM 341160001A01	75*	16	.25	.36	.50	.87	1.54	1.81	2.25	2.44	3.02	3.33	4.05	1.951	1.23	1.474	2.39
WINSTON-SALEM 344460002A01	75	27	.23	.36	.71	1.16	1.45	1.79	1.86	2.35	2.58	2.89	3.57	1.768	.97	1.430	2.12
OHIO AKRON 360060014A01	75	25	.65	1.32	2.25	2.76	2.95	3.17	3.83	4.11	4.43	5.00	8.97	3.441	1.67	3.023	1.75
CANTON 361000001A01	75*	20	.76	.88	1.59	2.03	3.18	3.91	4.04	4.49	4.61	4.96	9.75	3.601	2.03	3.030	1.91

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12506 - NITRATE
METHOD - 92 - HI-VOL REDUCTION-DIAZO COUPLING
UNITS - 01 - UG/CU METER (25 C)

URBAN

NO3

ANALYTICAL QUALITY CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
< 3	1.2	+- 13.9
3-6	-5.5	+- 12.0
> 6	1.3	+- 12.0

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
OHIO																	
CINCINNATI																	
361220001A01	75	25	.91	2.08	2.35	3.01	3.08	3.52	3.66	4.26	4.72	5.67	6.24	3.666	1.29	3.432	1.51
COLUMBUS																	
351460001A01	75*	20	1.54	1.62	2.30	2.55	3.64	3.79	4.34	4.85	4.98	5.66	6.15	3.886	1.40	3.603	1.52
DAYTON																	
361660001A01	75*	24	1.58	1.74	2.40	2.47	3.20	3.76	3.96	4.61	5.41	5.93	7.25	3.960	1.55	3.566	1.53
IRONTON																	
363060001A01	75*	17	.15	.66	.82	1.13	1.35	1.63	1.75	2.20	2.46	2.65	3.14	1.672	.81	1.403	2.06
PORTSMOUTH																	
365620002A01	75*	17	.10	.50	.60	.79	1.81	1.99	2.00	2.74	3.29	3.72	4.01	2.113	1.27	1.565	2.65
STEUBENVILLE																	
366420012A01	75*	18	.13	1.48	1.92	2.21	2.45	3.22	3.6-	4.20	4.54	5.17	6.31	3.308	1.56	2.699	2.36
TOLEDO																	
366600001A01	75*	20	LE	.29	1.97	2.36	2.48	2.56	3.55	4.32	4.52	5.54	16.25	3.833	3.39	2.450	3.75
YOUNGSTOWN																	
367760001A01	75	27	.94	2.27	2.47	3.10	3.16	3.65	3.82	4.08	4.92	5.39	6.59	3.744	1.30	3.497	1.49
OKLAHOMA																	
OKLAHOMA CITY																	
372200015A01	75*	25	.29	.57	1.05	1.32	1.39	1.76	2.23	2.46	3.18	4.36	4.92	2.144	1.32	1.722	2.08
OKLAHOMA CITY																	
372200029A01	75	27	.63	.92	1.00	1.33	1.65	2.10	2.38	2.81	3.35	3.59	4.61	2.259	1.13	1.977	1.72
TULSA																	
373000001A01	75*	22	1.21	1.37	2.08	2.66	3.16	3.33	3.42	3.46	3.85	4.28	5.99	3.235	1.16	3.022	1.47
OREGON																	
PORTLAND																	
381460001A01	75*	21	.89	1.00	1.15	1.47	1.98	2.04	2.28	2.45	2.92	3.62	4.46	2.251	1.01	2.041	1.58
PENNSYLVANIA																	
ALLENTOWN																	
390120001A01	75*	24	1.23	1.31	2.50	2.64	3.07	3.19	3.38	4.04	5.18	7.24	12.64	4.056	2.57	3.468	1.75
ALTOONA																	
390140001A01	75*	18	1.44	1.71	1.74	2.21	2.49	2.67	3.17	3.40	3.67	4.46	5.95	3.058	1.28	2.826	1.50
ERIE																	
393060002A01	75*	19	.58	.60	1.17	1.44	1.66	2.61	3.24	3.74	4.57	5.37	7.72	3.025	2.00	2.364	2.15
HAZLETON																	
393960001A01	75*	14	.70	.70	1.13	1.93	2.36	2.82	2.94	3.62	4.54	7.21	14.05	3.777	3.46	2.763	2.27
PHILADELPHIA																	
397140004A01	75	26	.50	1.62	2.42	2.84	3.01	3.23	4.27	4.67	6.13	6.81	8.43	4.044	2.02	3.456	1.89
PITTSBURGH																	
397260001A01	75*	24	.79	1.22	1.81	2.09	2.54	2.66	2.84	3.47	3.76	4.32	4.71	2.855	1.08	2.628	1.55
SCRANTON																	
398040001A01	75*	18	1.21	1.75	2.00	2.65	3.68	4.06	4.25	4.78	5.27	6.02	8.57	4.074	1.84	3.648	1.66
WARMINSTER																	
399160002A01	75*	19	.55	.90	1.88	2.46	2.74	3.07	3.17	3.30	3.41	4.35	5.87	2.924	1.25	2.596	1.75
WEST CHESTER																	
399280110A01	75	23	.69	1.27	2.18	2.55	2.65	3.19	3.93	4.30	4.35	5.78	7.25	3.528	1.68	3.107	1.73
WILKES-BARRE																	
399430001A01	75	24	.35	.52	1.96	2.46	2.73	3.25	3.34	3.63	4.32	5.51	8.26	3.330	1.96	2.655	2.19
YORK																	
399560322A01	75*	19	.43	1.41	1.72	3.02	3.33	3.96	4.58	4.83	5.27	5.55	11.94	4.104	2.48	3.370	2.05
PUERTO RICO																	
PONCE																	
401920002A01	75*	21	.46	.51	.58	.63	.70	.83	.87	.95	1.25	1.27	1.45	.882	.31	.830	1.42
RHODE ISLAND																	
EAST PROVIDENC																	
410120001A01	75*	21	.40	.69	1.18	1.35	1.52	1.93	2.65	2.92	3.22	4.14	5.90	2.411	1.45	1.997	1.94
PROVIDENCE																	
410300001A01	75*	23	.69	1.12	1.44	1.76	2.00	2.29	2.55	3.09	4.67	4.91	5.83	2.794	1.53	2.403	1.77
SOUTH CAROLINA																	
COLUMBIA																	
420760001A01	75	23	.57	.77	1.53	1.69	1.79	1.96	2.21	3.05	3.41	6.36	8.71	2.808	2.06	2.258	1.95
GREENVILLE																	
421180001A01	75	26	.23	.92	1.10	1.59	1.70	1.81	2.15	2.35	2.71	3.01	3.96	1.987	.87	1.743	1.81
TENNESSEE																	
CHATTANOOGA																	
440380001A01	75	25	.22	1.35	1.50	1.79	2.06	2.35	2.97	3.62	3.86	4.30	6.70	2.788	1.48	2.341	1.99

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12306 - NITRATE
METHOD - 92 - HI-VOL REDUCTION-DIAZO COUPLING
UNITS - 01 - UG/CU METER (25 C)

URBAN

NO3

ANALYTICAL QUALITY

CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
< 3	7.2	+- 13.9
3-6	-5.5	+- 12.0
> 6	1.3	+- 12.0

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
TENNESSEE																	
KNOXVILLE																	
441740002A01	75*	20	.58	1.34	1.70	1.96	2.11	2.23	2.34	2.92	3.06	4.46	5.01	2.605	1.17	2.345	1.64
MEMPHIS																	
442340001A01	75	27	.80	1.04	1.19	2.08	2.14	2.53	2.68	3.23	3.61	3.66	5.14	2.583	1.10	2.325	1.63
NASHVILLE																	
442540001A01	75*	18	1.00	1.32	1.80	2.17	2.75	2.92	3.12	3.94	4.02	5.35	5.72	3.224	1.44	2.900	1.63
TEXAS																	
AUSTIN																	
450220010A01	75*	23	.45	1.20	1.89	2.05	2.30	2.32	2.40	2.91	3.25	4.17	5.38	2.663	1.13	2.404	1.66
CORPUS CHRISTI																	
451950001A01	75*	21	.99	1.28	1.91	2.00	2.08	3.02	4.19	5.64	5.89	7.34	10.79	3.994	2.66	3.240	1.95
DALLAS																	
451310002A01	75	25	2.30	4.29	4.68	4.90	5.00	5.52	7.60	8.24	8.52	9.77	14.04	6.682	2.70	6.167	1.51
EL PASO																	
451700002A01	75*	26	1.00	1.13	1.49	1.73	1.81	1.95	2.19	2.44	3.12	3.45	3.58	2.211	.81	2.069	1.45
FORT WORTH																	
451880001A01	75	27	1.17	1.67	2.30	2.66	2.89	3.21	3.33	3.46	4.07	4.84	7.67	3.350	1.39	3.094	1.50
HOUSTON																	
452560001A01	75	24	.85	1.78	2.03	2.78	3.54	3.66	4.59	5.77	6.49	7.38	9.81	4.518	2.43	3.863	1.82
LUBBOCK																	
453340001A01	75*	16	.50	.59	.81	1.26	1.35	1.65	1.92	1.92	2.02	2.08	5.62	1.831	1.18	1.559	1.79
PASADENA																	
454050002A01	75*	18	.88	1.98	2.56	2.88	3.50	3.64	4.45	6.78	7.88	8.84	18.40	5.676	4.35	4.450	2.06
SAN ANTONIO																	
454570034A01	75*	23	.17	1.04	1.08	1.23	1.40	1.65	1.67	2.18	2.32	3.06	4.44	1.857	.94	1.600	1.88
WICHITA FALLS																	
455560002A01	75*	17	.61	1.00	1.48	1.68	2.15	2.39	2.39	2.64	3.45	3.74	4.48	2.449	1.04	2.204	1.66
UTAH																	
OGDEN																	
460680001A01	75*	23	.80	.81	1.23	1.36	1.75	1.93	2.90	3.44	4.09	6.90	16.53	3.603	4.01	2.453	2.29
SALT LAKE CITY																	
460920001A01	75	26	.88	1.04	1.21	1.39	1.68	2.16	2.88	3.06	3.84	5.14	12.31	3.309	3.17	2.447	2.10
VERMONT																	
PURLINGTON																	
470140003A01	75	24	.10	.32	.68	1.37	1.67	2.33	2.58	3.09	3.97	4.96	7.49	2.541	1.84	1.746	2.85
VIRGINIA																	
DANVILLE																	
480920001A01	75*	21	.87	1.23	2.08	2.21	2.40	2.82	2.85	3.08	3.33	3.75	5.17	2.812	1.03	2.619	1.50
HAMPTON																	
481440001A01	75*	25	.17	.50	1.03	1.32	1.92	2.44	2.57	3.18	3.45	3.88	4.98	2.318	1.30	1.787	2.43
LYNCHBURG																	
481840001A01	75	21	.14	.57	1.40	1.43	1.89	2.22	2.46	2.82	3.03	3.16	3.70	2.169	.91	1.849	2.07
NORFOLK																	
482140001A01	75*	21	.22	.40	.90	.95	1.70	2.29	2.45	2.92	3.31	3.80	4.49	2.234	1.28	1.745	2.29
PORTSMOUTH																	
482440001A01	75*	15	.12	1.56	1.61	2.63	2.69	4.10	4.37	4.46	4.53	5.38	8.18	3.609	1.98	2.778	2.68
RICHMOND																	
482660002A01	75*	25	.18	.66	1.23	1.61	1.83	2.30	2.48	2.97	3.10	3.89	4.12	2.273	1.15	1.870	2.11
ROANOKE																	
482700003A01	75*	22	.96	1.22	1.39	1.89	1.95	2.25	2.32	2.47	2.67	2.74	3.18	2.131	.58	2.044	1.36
WASHINGTON																	
SEATTLE																	
491840001A01	75*	26	.68	.73	.90	1.10	1.32	1.63	2.12	2.51	2.62	2.77	5.98	2.073	1.37	1.734	1.82
SPOKANE																	
492040001A01	75*	23	.21	.24	.52	.76	.90	1.22	1.55	1.90	2.26	2.55	2.84	1.374	.84	1.084	2.16
TACOMA																	
492140001A01	75	27	.39	.46	.66	.84	1.02	1.31	1.65	2.23	3.17	3.91	7.06	1.889	1.53	1.424	2.14
WEST VIRGINIA																	
CHARLESTON																	
500280001A01	75	24	.20	.26	.74	.88	2.00	2.06	2.16	2.41	2.79	4.80	8.61	2.290	1.92	1.598	2.59
SOUTH CHARLEST																	
501760001A01	75	25	.23	.30	.76	1.10	1.29	1.64	1.77	2.04	2.17	2.42	24.93	2.462	4.59	1.427	2.54
WISCONSIN																	
EAU CLAIRE																	
510840002A01	75	23	1.00	1.09	1.39	1.65	1.77	2.21	2.86	2.95	3.86	6.29	8.26	2.989	2.04	2.467	1.85

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12306 - NITRATE
METHOD - 92 - HI-VOL REDUCTION-DIAZO COUPLING
UNITS - 01 - UG/CU METER (25 C)

URBAN

NO3

ANALYTICAL QUALITY	95% CONF.
CONC. RANGE (UG/M3)	BIAS (%)	PRECISION (%)
< 3	1.2	+- 13.9
3-6	-5.5	+- 12.0
> 6	1.3	+- 12.0

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
WISCONSIN																	
KENOSHA																	
511540001A01	75+	17	.72	.87	2.05	2.91	3.60	6.37	6.64	8.08	9.36	12.13	15.24	6.470	4.53	4.757	2.46
MADISON																	
511860001A01	75+	19	1.67	1.68	2.59	3.38	4.01	4.44	4.66	5.13	6.00	6.71	13.60	4.877	2.74	4.284	1.68
MILWAUKEE																	
512200001A01	75	24	1.98	2.13	2.81	3.13	3.64	4.02	5.70	6.20	6.83	10.28	11.43	5.252	2.75	4.623	1.67
RACINE																	
512980002A01	75	24	.90	1.51	2.46	3.33	4.04	4.70	5.36	6.27	7.78	9.02	11.35	5.256	2.94	4.377	1.94
SUPERIOR																	
513480001A01	75+	17	.72	.75	.77	1.09	1.22	1.28	1.36	2.67	3.18	4.29	9.84	2.691	2.87	1.841	2.30
WYOMING																	
CASPER																	
520120001A01	75+	20	.24	.24	.43	.45	.48	.59	.79	.88	.96	1.05	1.52	.713	.34	.634	1.67

@REWIND NOMDATA.
FURPUR 2783 E33 SL73R1 04/27/78 09:14:57

@XQT TPFS.ABS

POLLUTANT - 12306 - NITRATE
METHOD - 92 - MI-VOL REDUCTION-DIAZO COUPLING
UNITS - 09 - UG/LU METER (25 C)

NONURBAN

NO 3

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ANALYTICAL QUALITY

CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
< 3	9.2	+- 13.9
3-6	-5.3	+- 12.0
> 6	1.3	+- 12.0

SITE	YR	NO.	MIN	1E	2G	3G	4G	5G	6G	7G	8G	9G	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
ARKANSAS MONTGOMERY CO 041760001A03	75*	21	.54	.57	.88	.93	1.09	1.31	1.41	1.43	2.24	2.41	3.32	1.440	.70	1.295	1.59
COLORADO MESA VERDE NAT 081530002A03	75*	22	.06	.11	.19	.27	.30	.40	.42	.57	.74	.77	1.05	.458	.27	.369	2.06
FLORIDA HARDEE CO 101680001A03	75*	22	.32	.35	.60	.89	1.08	1.16	1.33	1.46	1.55	2.51	4.86	1.366	.99	1.103	1.96
HAWAII HAWAII CO 120090001A03	75*	20	LD	NO. OF SAMPLES (11) BELOW MIN. DET. EXCEEDS 50%									.37				
HAWAII CO 120090002A03	75*	22	LD	LD	LD	.05	.07	.09	.12	.12	.16	.19	.21	.100	.06	.081	2.05
HAWAII VOLCANO 120090001A03	75*	14	LD	NO. OF SAMPLES (11) BELOW MIN. DET. EXCEEDS 50%									.14				
IDAHO BUTTE CO 130340001A03	75*	23	LD	LD	.15	.16	.26	.37	.41	.45	.52	.71	1.48	.417	.36	.273	2.93
INDIANA MONROE CO 152800001A03	75*	21	.09	.23	1.02	1.85	1.92	2.56	2.82	3.37	4.05	4.34	4.65	2.507	1.37	1.876	2.72
MAINE ACADIA NAT PAR 230010001A03	75*	19	.22	.32	.39	.52	.89	1.07	1.19	1.54	1.84	2.81	5.03	1.193	1.21	.998	2.35
MARYLAND CALVERT CO 210280001A03	75*	23	.47	.49	2.03	2.08	2.22	2.57	2.69	2.89	3.17	3.77	4.82	2.578	1.01	2.305	1.75
MISSISSIPPI JACKSON CO 251280001A03	75*	26	LD	LD	.31	.45	.66	.77	1.10	1.23	1.41	1.71	6.49	1.128	1.29	.590	4.20
MISSOURI SHANNON CO 264480002A03	75	24	.07	.19	.37	.46	.75	.99	1.04	1.59	1.70	1.83	2.68	1.070	.72	.792	2.45
MONTANA GLACIER NAT PA 270570001A03	75*	18	LD	LD	LD	LD	LD	.07	.07	.20	.27	.34	.50	.63			
POWDER RIVER C 271240008A03	75*	19	LD	.09	.15	.17	.18	.25	.26	.38	.40	.48	.67	.285	.18	.230	2.14
NEBRASKA THOMAS CO 282480001A03	75*	17	.22	.27	.31	.46	.54	.64	.81	1.11	1.44	1.64	2.15	.989	.58	.898	2.00
NEVADA WHITE PINE CO 290560001A03	75*	24	LD	LD	LD	LD	LD	.07	.09	.19	.32	.36	.69	1.10			
NEW HAMPSHIRE COOS CO 300140001A03	75*	22	.14	.26	.29	.36	.46	.59	.86	1.63	2.58	2.78	3.46	1.220	1.07	.789	2.69
NEW YORK JEFFERSON CO 333340001A03	75*	21	.11	.15	.39	.61	.89	1.38	1.62	1.78	2.35	2.87	4.78	1.509	1.15	1.030	2.77
RHODE ISLAND WASHINGTON CO 410380002A03	75*	22	.23	.36	.68	.80	.90	1.07	1.65	1.85	2.93	3.40	4.16	1.678	1.16	1.293	2.18
SOUTH CAROLINA PICKLAND CO 421900002A03	75*	26	.30	.50	.67	.72	.89	1.10	1.14	1.30	1.53	1.77	2.01	1.104	.46	1.000	1.61

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12506 - NITRATE
METHOD - 92 - HI-VOL REDUCTION-DIAZO COUPLING
UNITS - 07 - UG/CU METER (25 C)

NONURBAN
NO3

ANALYTICAL QUALITY CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
<3	-3.2	+- 33.0
3-6	-5.5	+- 12.0
> 6	1.3	+- 12.0

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
SOUTH DAKOTA BLACK HILLS NA 430110001A03	75*	22	.11	.12	.16	.19	.25	.30	.32	.36	.49	.85	2.77	.471	.59	.322	2.19
TENNESSEE CUMBERLAND CO 440630001A03	75	27	LD	.42	.53	.96	1.45	1.75	2.05	2.53	2.72	2.82	5.04	1.863	1.24	1.290	3.12
TEXAS MATAGORDA CO 453530001A03	75*	25	.81	1.10	1.15	1.40	1.44	1.55	1.65	2.29	2.73	3.07	4.42	1.882	.88	1.705	1.57
TOM GREEN CO 455200001A03	75*	24	.33	.35	.69	.83	.91	1.07	1.16	1.56	1.80	2.13	3.56	1.295	.78	1.097	1.81
VERMONT ORANGE CO 470360001A03	75*	24	.14	.38	.46	.65	1.07	1.60	1.84	3.08	3.21	3.65	11.85	2.246	2.46	1.402	2.61
VIRGINIA SHENANDOAH NAT 442890001A03	75*	19	.11	.15	.43	.59	.68	.79	.91	.94	1.92	2.02	4.07	1.129	.93	.798	2.47
WYTHE CO 483440001A03	75*	22	.09	.11	.46	.55	.66	.91	1.02	1.14	1.38	1.83	3.02	1.018	.70	.774	2.35
WASHINGTON KING CO 490980002A03	75*	24	LD	LD	.09	.30	.50	.91	1.09	1.33	1.66	2.26	4.81	1.231	1.27	.555	4.97
WYOMING YELLOWSTONE NA 570860001A03	75*	17	LD	.06	.10	.15	.23	.31	.35	.43	.65	.79	1.45	.411	.37	.271	2.61

&REWIND NO=DATA.
FURPUR 2783 E33 SL73R1 04/27/78 09:10:54

&XQT TPFS.ABS

POLLUTANT - 12403 - SULFATE
METHOD - 91 - HI-VOL COLORIMETRIC
UNITS - 01 - UG/CU METER (25 C)

URBAN

S 0 4

ANALYTICAL QUALITY

CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
<10	5.9	+- 13.5
10-25	-4.2	+- 10.2
>25	.4	+- 10.2

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
ALABAMA																	
BIRMINGHAM																	
01003800D3AD1	75*	23	5.2	5.4	6.5	6.7	7.5	9.8	10.8	11.3	13.5	21.0	42.0	11.71	8.1	10.04	1.69
GADSDEN																	
01146300D1AD1	75*	20	5.5	5.7	6.2	7.7	8.6	10.1	12.0	13.1	15.6	17.7	25.4	11.69	5.2	10.66	1.55
HUNTSVILLE																	
01186000D1AD1	75*	19	4.1	4.5	5.8	6.4	6.7	8.3	9.0	10.8	14.2	16.2	19.8	9.84	4.7	8.83	1.61
MOBILE																	
01238000D1AD1	75	25	4.1	5.5	5.9	6.3	6.4	8.7	9.3	11.8	13.0	16.2	21.2	9.59	4.4	8.71	1.55
MONTGOMERY																	
01246000D1AD1	75	25	2.2	3.0	3.2	4.4	4.8	5.6	7.2	8.4	9.8	14.2	33.3	7.66	6.3	6.15	1.89
ALASKA																	
ANCHORAGE																	
02004D03AD1	75*	26	LD	.7	.9	1.1	1.2	1.2	1.3	1.5	1.7	1.8	2.3	1.30	.4	1.17	1.70
FAIRBANKS																	
02016D01AD1	75*	15	LD	LD	LD	.9	1.0	1.6	3.1	4.6	5.2	5.3	6.1	2.64	2.2	1.57	3.30
ARIZONA																	
DOUGLAS																	
03024D04AD1	75*	21	2.0	2.5	3.6	3.8	4.9	5.4	6.2	6.4	7.3	7.7	13.0	5.78	2.5	5.29	1.55
PHOENIX																	
03060002AD1	75*	17	1.7	1.9	2.6	2.8	3.2	3.7	3.9	4.4	5.7	6.1	6.9	3.95	1.5	3.67	1.49
TUCSON																	
03096D01AD1	75	25	1.4	1.7	2.1	3.0	3.6	3.9	4.3	6.2	6.4	7.8	10.9	4.56	2.4	3.95	1.75
ARKANSAS																	
LITTLE ROCK																	
04144D01AD1	75	26	3.0	4.3	4.6	5.8	6.3	7.0	8.5	9.5	11.4	12.2	25.7	8.42	4.6	7.50	1.61
TEXARKANA																	
04256D01AD1	75*	20	2.2	3.1	4.4	5.4	6.0	7.7	6.4	9.2	9.9	11.2	21.5	8.01	4.2	7.08	1.68
WEST MEMPHIS																	
04274D01AD1	75	24	1.7	3.8	6.1	7.5	9.3	10.2	11.0	14.1	16.0	21.1	52.0	13.12	10.4	10.40	2.01
CALIFORNIA																	
ANAHEIM																	
05023D01AD1	75*	26	3.4	4.6	5.1	6.6	7.1	8.6	11.1	17.6	20.5	25.4	43.5	13.62	10.4	10.79	2.03
BERKELEY																	
05074D01AD1	75	26	1.7	2.5	2.7	3.5	3.9	4.3	4.5	4.8	5.5	6.6	8.0	4.41	1.6	4.11	1.48
BURBANK																	
05093D02AD1	75*	22	3.8	5.3	7.0	9.2	11.4	14.1	15.3	19.9	21.1	24.0	35.0	15.54	8.7	13.21	1.83
FRESNO																	
05280D02AD1	75*	26	1.1	1.7	1.8	2.4	3.0	3.7	4.5	5.2	5.9	6.4	8.2	4.07	2.0	3.55	1.74
GLENDALE																	
05294D03AD1	75*	21	LD	LD	2.1	3.8	6.5	8.3	10.2	11.4	12.8	23.6	33.6	10.05	8.7	5.93	3.73
LONG BEACH																	
05410D01AD1	75	24	4.3	4.6	6.3	7.0	8.3	9.1	11.6	12.5	15.5	26.3	37.2	12.82	8.7	10.62	1.83
LOS ANGELES																	
05478D01AD1	75*	26	1.6	3.8	4.7	7.2	7.7	9.8	12.5	13.8	19.8	23.4	28.9	12.07	7.3	9.78	2.02
OAKLAND																	
05530D01AD1	75	23	1.7	2.0	2.5	2.7	3.1	3.3	3.8	5.0	6.4	7.3	7.9	4.25	2.0	3.82	1.60
PASADENA																	
05575D02AD1	75*	25	1.4	3.1	5.4	6.5	7.8	10.3	11.7	15.1	16.7	20.6	34.4	11.57	7.7	9.15	2.11
SACRAMENTO																	
05558D01AD1	75	25	LD	1.5	1.7	2.3	2.5	3.0	3.4	3.8	4.0	5.2	5.8	3.06	1.4	2.52	2.20
SAN BERNARDINO																	
05668D01AD1	75	27	1.6	2.1	4.4	7.4	9.1	12.7	13.2	19.0	23.3	25.8	30.8	13.63	9.2	9.85	2.59
SAN DIEGO																	
05590D04AD1	75	23	4.1	4.5	5.4	5.8	6.0	6.7	7.1	7.7	10.2	13.0	21.1	8.17	4.3	7.39	1.54
SAN FRANCISCO																	
05586D01AD1	75	25	1.9	2.5	2.7	3.1	3.4	4.1	4.6	5.3	6.2	7.2	7.8	4.43	1.7	4.10	1.50
SAN JOSE																	
05698D04AD1	75	26	1.3	1.9	2.1	2.2	2.5	3.6	3.9	4.2	5.1	5.4	6.4	3.57	1.4	3.26	1.56
SANTA ANA																	
05718D01AD1	75*	23	2.7	3.1	5.1	5.7	6.4	8.7	8.9	9.9	20.5	26.5	43.9	12.48	10.6	9.27	2.16
TORRANCE																	
05826D01AD1	75	26	3.1	5.7	6.3	7.5	8.0	9.0	10.6	12.6	20.8	22.7	39.3	12.85	9.0	10.56	1.85
COLORADO																	
DENVER																	
08058D01AD1	75*	15	2.4	2.5	2.9	3.2	3.3	3.5	3.6	3.9	4.3	5.3	9.2	3.91	1.6	3.69	1.39
DENVER																	
08058D02AD1	75*	26	2.2	2.4	2.8	3.0	3.2	3.5	3.9	4.2	4.7	5.6	9.0	4.00	1.6	3.75	1.42

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12403 - SULFATE
METHOD - 91 - HI-VOL COLORIMETRIC
UNITS - 01 - UG/CU METER (25 C)

URBAN

S O 4

ANALYTICAL QUALITY CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
<10	5.9	+- 13.5
10-25	-4.2	+- 10.2
>25	.4	+- 10.2

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
CONNECTICUT																	
BRIDGEPORT																	
070060001A01	75	24	5.9	7.0	7.6	7.9	8.7	9.1	11.1	12.5	13.7	17.6	19.5	11.01	3.8	10.42	1.39
HARTFORD																	
070420002A01	75	27	3.9	5.2	5.6	6.9	8.4	9.5	10.2	11.3	12.5	15.7	21.4	10.01	4.2	9.21	1.52
NEW HAVEN																	
070700001A01	75	27	5.6	7.4	8.2	8.9	9.8	11.5	12.1	12.8	13.9	18.5	20.2	11.80	4.0	11.17	1.39
WATERBURY																	
071240001A01	75	27	3.4	5.3	7.0	7.5	8.1	9.8	10.1	12.2	16.2	17.3	19.6	10.62	4.5	9.65	1.58
DELAWARE																	
NEWARK																	
080140001A01	75	24	5.3	5.7	7.2	8.1	8.7	9.8	10.6	12.1	12.9	17.6	23.9	10.93	4.7	10.12	1.48
WILMINGTON																	
080260002A01	75*	19	5.1	6.8	7.5	9.2	9.5	9.8	11.0	11.7	12.3	14.9	32.2	11.49	5.7	10.58	1.48
FLORIDA																	
JACKSONVILLE																	
101960002A01	75*	26	4.0	6.2	6.3	7.3	7.5	8.1	8.9	9.3	10.0	10.2	13.0	8.34	2.1	8.07	1.30
MIAMI																	
102700002A01	75*	21	2.3	2.6	3.6	4.1	4.3	4.6	5.1	6.1	6.3	6.7	9.9	5.06	1.7	4.79	1.40
ST PETERSBURG																	
103980002A01	75*	23	.6	5.5	6.3	7.1	7.8	8.5	8.7	9.6	13.6	18.8	37.0	10.59	7.1	8.63	2.09
GEORGIA																	
ATLANTA																	
110200001A01	75	25	2.7	4.1	4.3	5.1	5.9	6.7	7.1	8.1	9.1	12.6	38.4	8.40	7.1	6.96	1.74
COLUMBUS																	
111280001A01	75	26	2.9	3.4	3.9	4.8	4.9	5.4	6.7	6.8	9.9	12.0	40.3	7.88	7.3	6.42	1.77
SAVANNAH																	
114500001A01	75	26	2.6	4.3	5.3	7.0	7.3	8.0	10.1	10.8	13.7	14.5	34.1	10.20	6.3	8.75	1.75
HAWAII																	
HONOLULU																	
120120001A01	75	27	1.7	4.6	4.8	5.2	5.5	6.1	6.6	7.3	7.6	8.6	9.1	6.23	1.6	5.96	1.39
ILLINOIS																	
CHICAGO																	
141220001A01	75*	17	7.5	7.9	11.0	12.6	14.5	14.5	14.6	18.9	24.6	25.5	38.6	17.26	7.8	15.83	1.52
EAST ST LOUIS																	
142120001A01	75*	16	4.4	6.0	8.3	9.3	10.2	12.0	12.2	13.5	13.5	17.6	33.3	12.97	6.7	11.67	1.58
JOLIET																	
143760001A01	75*	22	4.3	5.9	7.1	8.2	8.5	9.1	9.4	11.6	16.5	17.2	23.4	11.16	5.0	10.21	1.53
MOLINE																	
145120001A01	75*	24	4.1	4.8	7.0	7.4	8.3	9.0	9.3	11.6	13.8	17.0	30.1	10.77	5.6	9.70	1.57
NORTH CHICAGO																	
145620002A01	75*	23	.9	3.0	6.4	7.1	7.9	8.5	8.8	11.0	13.1	16.8	24.8	10.02	5.2	8.52	1.94
PEORIA																	
146080001A01	75*	23	5.1	8.4	10.2	12.4	14.5	15.4	16.2	18.4	19.4	22.5	36.3	16.42	7.0	15.04	1.54
ROCKFORD																	
146680001A01	75*	23	3.5	3.9	6.4	6.7	7.8	8.1	8.5	9.3	10.3	13.7	23.5	9.13	4.4	8.31	1.54
ROCK ISLAND																	
146700001A01	75	23	5.2	5.9	7.7	9.5	9.6	10.0	10.9	12.4	13.5	20.3	32.3	12.08	6.0	10.99	1.53
SPRINGFIELD																	
147280001A01	75*	17	5.0	5.3	5.3	5.9	8.0	10.4	10.7	12.3	14.1	14.2	18.6	10.18	4.4	9.29	1.56
INDIANA																	
EAST CHICAGO																	
151180001A01	75*	23	7.8	9.4	12.9	14.0	15.9	16.4	16.5	17.5	20.0	26.4	49.5	18.31	8.7	16.86	1.47
EVANSVILLE																	
151300001A01	75	23	5.7	5.8	7.3	8.1	9.1	10.3	11.8	12.8	15.7	25.1	38.4	13.30	8.4	11.43	1.70
FORT WAYNE																	
151380002A01	75*	17	5.5	6.3	8.4	9.4	10.7	11.3	11.3	12.2	13.1	15.7	25.4	12.04	4.8	11.25	1.45
GARY																	
151520001A01	75*	20	7.7	8.5	9.2	9.9	12.0	14.1	15.5	21.4	23.6	25.0	33.6	16.49	7.5	14.98	1.56
HAMMOND																	
151780002A01	75	24	5.6	7.9	9.7	11.7	12.5	13.5	14.5	15.6	16.7	19.8	23.6	13.91	4.3	13.22	1.39
SOUTH BEND																	
5380002A01	75	27	3.5	5.4	7.4	8.1	8.5	9.8	10.3	12.3	15.0	16.3	26.5	11.25	5.4	10.17	1.57
TERRE HAUTE																	
154080001A01	75*	22	6.6	7.3	7.9	9.9	10.7	10.9	12.8	15.5	20.5	22.3	33.3	14.25	6.9	12.87	1.57
IOWA																	
CEDAR RAPIDS																	
95060001BA01	75	22	4.0	5.3	7.0	7.7	8.4	9.5	9.6	11.5	13.1	13.4	14.2	9.70	2.9	9.23	1.40

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12403 - SULFATE
METHOD - 91 - HI-VOL COLORIMETRIC
UNITS - 01 - UG/CU METER (25 C)

U R B A N

S O 4

ANALYTICAL QUALITY	95% CONF.
CONC. RANGE (UG/M3)	BIAS (%)	PRECISION (%)
<10	5.9	+- 13.5
10-25	-4.2	+- 10.2
>25	.4	+- 10.2

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
IOWA																	
DAVENPORT																	
163060001A01	75*	24	5.5	6.2	6.8	7.0	8.8	9.7	10.5	12.2	14.8	20.2	27.0	11.37	5.4	10.35	1.53
DES MOINES																	
153180001A01	75	25	1.8	4.3	4.4	4.9	5.6	6.1	6.5	7.0	8.2	10.6	13.7	6.56	2.6	6.04	1.53
DUBUQUE																	
153260002A01	75*	21	2.3	3.2	4.8	5.1	5.6	6.2	6.6	6.9	7.3	12.5	22.5	7.46	4.6	6.50	1.67
DUBUQUE																	
153260008A01	75*	24	1.5	2.4	3.6	3.8	5.2	5.5	5.6	5.9	8.2	12.3	33.7	7.25	6.6	5.70	1.92
WATERLOO																	
163760004A01	75	25	3.3	4.0	4.5	6.0	6.5	7.1	7.5	9.0	10.1	11.4	14.8	7.59	2.9	7.06	1.48
KANSAS																	
KANSAS CITY																	
171800002A01	75*	18	3.6	3.9	4.7	5.0	5.6	6.5	7.6	8.1	8.3	10.4	13.7	7.08	2.6	6.64	1.44
KANSAS CITY																	
171800012A01	75	25	5.2	6.7	7.1	8.0	8.3	8.9	9.8	10.6	15.4	16.7	20.2	10.56	4.3	9.82	1.45
TOPEKA																	
173560001A01	75	24	1.8	2.3	3.0	3.6	3.7	4.1	4.6	5.1	5.8	6.7	13.2	4.69	2.3	4.27	1.53
WICHITA																	
173740001A01	75*	25	1.8	2.7	3.4	4.2	4.6	4.9	5.1	6.2	6.9	8.7	10.6	5.34	2.2	4.87	1.56
KENTUCKY																	
ASHLAND																	
190080002A01	75*	23	3.9	5.6	7.6	10.4	11.2	11.8	17.2	18.9	19.6	42.0	60.2	19.00	15.0	14.72	2.04
BOWLING GREEN																	
180320001A01	75*	20	3.9	5.2	6.2	6.5	7.4	8.1	8.4	11.0	13.6	15.6	19.4	9.74	4.3	8.90	1.54
COVINGTON																	
180800001A01	75*	24	4.7	4.7	6.3	7.1	8.6	9.8	11.5	13.1	14.8	26.6	31.7	12.22	7.4	10.49	1.73
LOUISVILLE																	
182380002A01	75	24	5.6	6.5	7.0	8.0	9.0	9.4	11.0	13.5	13.6	29.0	33.7	13.10	8.1	11.36	1.66
LOUISIANA																	
BATON ROUGE																	
190280001A01	75	22	4.1	4.1	4.7	6.6	7.2	7.9	8.3	8.5	8.7	12.2	15.7	8.17	3.0	7.67	1.43
IBERVILLE PAR																	
191280002A01	75*	18	3.3	3.9	5.5	6.1	6.2	6.6	10.8	11.8	12.6	15.5	19.5	9.65	4.9	8.46	1.71
NEW ORLEANS																	
192020002A01	75	23	3.6	4.9	6.5	7.8	8.1	8.9	9.6	10.2	14.9	19.2	19.3	10.51	4.8	9.51	1.58
SHREVEPORT																	
192740001A01	75*	25	3.4	4.7	5.4	5.7	7.2	8.1	8.3	9.3	9.9	10.6	10.8	7.69	2.2	7.32	1.39
MARYLAND																	
BALTIMORE																	
210120001A01	75*	22	5.5	5.7	7.3	9.0	10.4	11.2	11.7	12.6	17.1	17.8	28.3	12.70	6.1	11.52	1.55
MICHIGAN																	
DEARBORN																	
231140001A01	75*	23	4.3	8.1	10.2	11.0	12.0	12.9	15.5	17.0	20.1	31.9	40.6	16.34	9.0	14.36	1.67
DETROIT																	
231810001A01	75	27	4.0	7.4	7.6	8.7	10.7	11.9	13.0	14.8	17.2	25.6	35.8	13.93	7.4	12.34	1.64
FLINT																	
231580008A01	75*	15	4.2	5.8	6.1	7.6	8.0	9.0	9.0	10.6	11.6	16.6	30.7	10.53	6.4	9.31	1.61
GRAND RAPIDS																	
231920001A01	75*	25	4.2	4.8	5.8	7.4	7.6	8.8	9.6	14.0	15.4	16.7	34.5	11.25	7.2	9.67	1.71
LANSING																	
232840001A01	75*	19	5.1	5.9	6.3	9.2	10.9	11.2	11.2	15.6	19.2	24.9	46.9	14.78	10.0	12.44	1.78
SAGINAW																	
234760001A01	75	27	2.3	3.5	5.4	6.7	7.1	7.5	9.3	10.8	14.0	15.7	35.2	10.33	7.1	8.59	1.83
TRENTON																	
235120004A01	75*	22	3.7	6.9	7.3	7.9	8.8	9.9	11.0	14.5	19.0	27.5	34.7	13.51	8.1	11.60	1.74
MINNESOTA																	
DULUTH																	
241040001A01	75*	22	1.9	2.6	3.6	4.1	4.7	5.5	6.3	7.3	7.7	8.3	8.7	5.69	2.0	5.27	1.52
MINNEAPOLIS																	
242260027A01	75	26	2.4	2.7	3.1	3.8	5.7	6.3	6.6	6.8	7.5	9.4	15.4	6.45	3.3	5.71	1.66
ST PAUL																	
243000031A01	75*	22	2.7	2.7	3.2	3.8	5.8	6.1	6.7	7.5	8.6	9.6	11.2	6.29	2.5	5.76	1.56
MISSISSIPPI																	
JACKSON																	
251260002A01	75	25	3.4	4.3	5.4	5.9	7.1	7.6	7.9	8.7	9.7	13.2	19.3	8.20	3.6	7.54	1.50

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12403 - SULFATE
METHOD - 93 - HI-VOL COLORIMETRIC
UNITS - 01 - UG/CU METER (25 C)

URBAN

SOA

ANALYTICAL QUALITY

CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
<10	5.9	+- 13.5
10-25	-4.2	+- 10.2
>25	.4	+- 10.2

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
MISSOURI ST LOUIS 264280001A01	75*	23	5.3	7.5	9.9	11.2	12.8	16.2	17.1	17.8	20.8	24.2	39.4	16.43	7.4	14.93	1.57
MONTANA HELENA 270720001A01	75*	16	LD	1.0	1.4	2.0	2.4	2.5	2.8	2.8	4.6	6.0	6.4	3.02	1.8	2.39	2.24
NEBRASKA LINCOLN 281560002A01	75*	24	1.8	2.1	2.4	2.5	3.2	3.7	4.0	6.2	6.7	9.4	10.8	4.87	2.7	4.20	1.73
NEVADA LAS VEGAS 290320001A01	75*	23	1.6	1.8	2.0	2.2	2.3	2.8	3.1	3.5	3.6	5.0	5.6	3.08	1.1	2.89	1.43
RENO 290480001A01	75	27	1.2	1.2	1.9	2.2	2.3	2.5	2.7	3.2	3.8	4.2	5.3	2.86	1.1	2.66	1.46
NEW HAMPSHIRE CONCORD 300120002A01	75*	17	4.0	4.2	6.0	6.6	7.7	8.9	9.5	10.0	13.4	17.8	19.3	9.85	4.6	8.91	1.58
NEW JERSEY BAYONNE 310180001A01	75*	22	4.5	5.4	6.4	7.6	9.3	9.9	10.3	13.6	16.7	18.1	47.4	12.60	8.9	10.78	1.70
CAMDEN 310720001A01	75*	22	6.4	6.9	8.2	9.1	9.7	12.1	14.3	15.1	16.9	21.0	39.4	14.20	7.6	12.73	1.58
CAMDEN CO 310740003A01	75*	20	4.9	5.8	6.9	8.2	8.7	9.3	10.2	11.2	14.5	15.0	17.4	10.28	3.6	9.69	1.42
ELIZABETH 311300002A01	75	26	4.8	6.5	7.7	8.7	10.0	11.1	12.9	13.2	14.4	19.5	33.6	13.07	7.1	11.65	1.60
GLASSBORO 311700301A01	75*	22	4.5	5.2	5.8	7.8	7.8	8.1	9.5	10.1	11.6	12.0	14.8	8.97	2.8	8.58	1.36
JERSEY CITY 312320001A01	75*	20	4.6	5.9	6.5	7.4	8.8	11.0	11.3	11.9	12.5	19.1	26.9	11.34	5.4	10.32	1.55
NEWARK 313480001A01	75*	24	3.3	3.8	5.2	6.2	7.6	8.7	9.6	11.2	12.2	16.8	26.4	9.82	5.3	8.64	1.68
PERTH AMBOY 314220001A01	75*	23	5.0	6.1	6.6	7.5	7.7	10.4	10.9	11.9	12.4	15.0	38.0	11.29	6.9	10.06	1.57
TRENTON 315400001A01	75	25	5.3	6.0	6.4	7.5	8.4	10.4	12.7	13.6	14.8	20.4	60.2	13.25	11.1	11.01	1.74
NEW YORK ALBANY 330040001A01	75	22	3.6	3.9	6.4	7.4	8.2	10.9	13.8	15.0	16.6	18.2	26.0	11.82	5.8	10.40	1.71
BUFFALO 330660001A01	75	25	5.5	8.3	9.2	10.4	10.6	11.3	11.9	14.1	14.3	32.7	37.8	14.53	8.4	12.89	1.59
NEW YORK CITY 334680014A01	75*	22	6.1	6.4	7.5	9.7	11.1	11.9	13.2	13.4	15.7	18.8	29.3	12.73	5.4	11.77	1.49
NIAGARA FALLS 336740001A01	75	27	4.6	6.6	7.4	8.8	9.8	11.5	12.6	14.0	16.2	23.9	44.6	13.70	8.8	11.79	1.70
ROCHESTER 335760001A01	75	24	4.6	6.0	8.4	8.4	9.4	9.8	11.2	12.8	13.5	28.2	37.5	13.29	8.6	11.43	1.69
SYRACUSE 336620001A01	75*	18	4.1	5.2	6.4	6.9	8.0	10.0	11.7	12.1	13.8	15.6	26.9	10.98	5.6	9.82	1.62
UTICA 336880001A01	75	24	4.0	5.2	7.0	7.5	8.6	9.2	10.3	13.9	16.2	17.8	20.9	11.10	4.9	10.08	1.57
YONKERS 337620001A01	75*	19	7.1	8.1	9.1	9.8	11.1	11.8	13.1	14.3	15.4	18.1	33.9	13.94	6.5	12.86	1.47
NORTH CAROLINA CHARLOTTE 340700001A01	75	25	4.5	5.0	5.5	5.7	6.1	7.2	7.5	8.4	9.7	11.2	19.0	7.80	3.1	7.32	1.41
DURHAM 341160001A01	75*	16	4.0	4.7	7.0	9.0	9.5	9.7	13.6	13.8	16.9	21.8	24.0	12.67	6.2	11.22	1.69
WINSTON-SALEM 344660002A01	75	27	4.0	5.7	6.3	6.8	7.5	8.0	8.3	10.4	11.6	15.2	25.5	9.93	5.2	8.94	1.55
OHIO AKRON 360060014A01	75	25	8.5	10.5	10.8	11.7	13.7	14.8	15.0	15.3	15.8	29.1	32.2	15.67	6.2	14.71	1.43
CANTON 351000001A01	75*	20	6.6	8.7	10.2	12.9	14.0	14.8	16.7	17.0	18.1	28.8	35.5	16.74	7.3	15.40	1.51

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12403 - SULFATE
METHOD - 91 - HI-VOL COLORIMETRIC
UNITS - 01 - UG/CU METER (25 C)

URBAN

S O 4

ANALYTICAL QUALITY CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
<10	5.9	+- 13.5
10-25	-4.2	+- 10.2
>25	.4	+- 10.2

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
OHIO																	
CINCINNATI																	
361220001A01	75	25	5.8	7.0	7.9	9.9	11.5	12.4	12.8	14.9	16.2	22.3	33.8	13.72	6.9	12.38	1.56
COLUMBUS																	
361460001A01	75*	20	5.8	6.4	7.6	9.2	10.8	11.7	12.0	12.2	12.9	17.3	23.8	11.63	4.2	10.96	1.42
DAYTON																	
361660001A01	75*	24	5.1	6.1	8.8	9.6	10.4	12.7	13.6	14.6	15.3	20.0	27.8	13.04	5.4	12.02	1.51
IRONTON																	
363080001A01	75*	17	6.3	7.1	8.1	9.8	13.9	16.0	17.9	22.9	30.1	30.8	35.8	18.66	9.9	16.10	1.77
PORTSMOUTH																	
365620002A01	75*	17	5.8	6.8	7.5	8.5	9.4	11.6	12.0	15.5	17.8	23.1	39.9	14.89	9.8	12.67	1.74
STEUBENVILLE																	
366420012A01	75*	18	5.6	5.8	10.5	11.2	13.9	15.4	19.0	22.3	28.6	34.6	37.0	19.02	10.2	16.40	1.78
TOLEDO																	
366800001A01	75*	20	4.3	6.5	8.6	9.1	10.0	11.5	12.9	14.2	18.8	25.0	34.9	14.29	8.2	12.48	1.68
YOUNGSTOWN																	
367760001A01	75	27	6.7	8.4	9.4	9.6	11.6	12.7	12.8	14.3	15.1	17.4	36.3	13.88	6.6	12.80	1.47
OKLAHOMA																	
OKLAHOMA CITY																	
372200015A01	75*	25	1.9	2.6	2.7	3.1	4.7	5.3	6.0	7.7	9.1	10.7	13.9	6.13	3.3	5.27	1.77
OKLAHOMA CITY																	
372200029A01	75	27	1.9	2.3	2.9	3.7	4.3	4.7	5.0	5.6	7.5	9.0	11.2	5.30	2.5	4.74	1.62
TULSA																	
375000001A01	75*	22	2.4	2.9	4.6	4.9	5.4	6.1	6.4	7.6	8.1	9.5	13.0	6.52	2.6	6.01	1.53
OREGON																	
PORTLAND																	
381460001A01	75*	21	2.1	3.3	3.6	3.9	4.1	4.6	5.5	5.8	5.9	7.2	10.1	5.19	1.9	4.87	1.44
PENNSYLVANIA																	
ALLENTOWN																	
390120001A01	75*	24	4.3	4.5	7.5	7.7	8.4	10.7	11.5	13.7	15.7	19.0	23.5	11.64	5.3	10.53	1.59
ALTOONA																	
390140001A01	75*	18	5.2	5.3	5.8	5.8	7.8	8.2	9.9	13.6	14.4	23.7	35.7	12.41	8.9	10.25	1.82
ERIE																	
393060002A01	75*	19	2.6	3.6	5.4	6.6	7.5	9.2	9.7	10.9	11.7	14.2	38.2	11.04	8.7	8.89	1.91
HAZLETON																	
393960001A01	75*	14	5.2	5.2	7.1	7.6	9.1	10.6	11.8	13.4	14.0	17.1	30.7	12.01	6.4	10.75	1.60
PHILADELPHIA																	
397140004A01	75	26	5.7	7.1	8.0	8.8	9.3	12.4	13.1	14.0	15.0	15.9	32.9	12.48	5.5	11.55	1.47
PITTSBURGH																	
397260001A01	75*	24	5.3	6.5	9.4	10.5	11.5	12.5	12.7	13.4	15.8	18.7	28.3	13.25	5.2	12.34	1.46
SCRANTON																	
398040001A01	75*	18	5.1	5.6	7.7	8.7	10.9	11.0	11.7	13.2	13.5	14.8	20.0	11.34	3.9	10.64	1.46
WARMINSTER																	
399160002A01	75*	19	5.9	6.3	7.2	7.7	9.2	10.2	11.0	13.9	17.8	21.0	38.0	13.56	8.6	11.63	1.71
WEST CHESTER																	
399280110A01	75	23	4.9	6.6	7.4	9.9	10.7	11.2	11.7	11.9	13.4	14.3	19.3	11.16	3.3	10.66	1.37
WILKES-BARRE																	
399430001A01	75	24	4.3	6.1	7.5	7.7	10.3	10.9	11.1	12.3	13.3	19.3	27.5	11.65	5.3	10.66	1.52
YORK																	
399560322A01	75*	19	4.0	5.8	7.6	9.4	10.9	12.9	15.0	16.2	18.6	24.9	72.6	18.02	16.6	13.79	2.02
PUERTO RICO																	
PONCE																	
401920002A01	75*	21	2.9	2.9	3.1	3.5	4.0	4.6	4.7	5.0	5.2	6.4	7.2	4.54	1.2	4.39	1.31
RHODE ISLAND																	
EAST PROVIDENC																	
410120001A01	75*	21	4.5	4.6	5.4	6.3	6.5	7.8	8.1	10.3	13.0	15.1	18.9	8.98	4.1	8.21	1.52
PROVIDENCE																	
410300001A01	75*	23	4.1	5.2	6.2	6.8	7.3	9.1	10.3	11.8	12.5	15.8	21.9	10.11	4.5	9.23	1.54
SOUTH CAROLINA																	
COLUMBIA																	
420760001A01	75	23	4.0	4.0	4.4	4.9	4.9	6.9	7.4	8.0	8.4	15.4	25.3	8.21	5.2	7.13	1.66
GREENVILLE																	
421180001A01	75	26	4.0	4.6	5.2	5.7	6.0	6.5	6.8	8.0	9.0	10.2	21.6	7.70	3.8	7.07	1.48
TENNESSEE																	
CHATTANOOGA																	
440380001A01	75	25	5.0	5.3	5.7	6.3	7.6	7.9	8.2	9.2	9.7	15.3	26.9	9.36	5.3	8.43	1.53

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12403 - SULFATE
METHOD - 91 - HI-VOL COLORIMETRIC
UNITS - 01 - UG/CU METER (25 C)

URBAN
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ANALYTICAL QUALITY

CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
<10	5.9	+- 13.5
10-25	-4.2	+- 10.2
>25	.4	+- 10.2

SITE	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
TENNESSEE																	
KNOXVILLE																	
441740002A01	75*	20	5.2	5.6	6.0	6.7	7.1	9.1	9.4	10.0	13.2	15.6	20.3	9.85	4.1	9.12	1.48
MEMPHIS																	
442340001A01	75	27	3.9	5.1	5.2	5.5	6.1	7.6	8.7	9.4	10.0	13.7	18.7	8.47	3.9	7.75	1.51
NASHVILLE																	
442540001A01	75*	18	5.2	5.6	6.9	7.6	8.0	9.9	12.2	14.8	15.6	20.2	25.0	12.14	5.9	10.87	1.62
TEXAS																	
AUSTIN																	
450220010A01	75*	23	1.7	2.7	3.8	4.1	4.4	4.9	5.9	6.1	8.2	11.0	13.9	6.07	3.1	5.37	1.65
CORPUS CHRISTI																	
451150001A01	75*	21	1.8	2.7	3.6	3.8	5.1	6.2	6.9	8.6	12.1	12.7	21.9	7.70	4.9	6.42	1.66
DALLAS																	
451310002A01	75	25	3.9	6.6	8.7	10.5	10.8	12.8	14.5	15.1	15.8	24.9	28.8	13.53	6.2	12.19	1.61
EL PASO																	
451700002A01	75*	26	3.1	4.4	4.6	5.5	6.0	6.7	7.5	8.0	8.8	9.4	13.4	7.00	2.4	6.61	1.41
FORT WORTH																	
451880001A01	75	27	1.8	2.7	3.3	4.3	4.9	5.2	5.4	6.1	9.4	10.1	11.4	6.00	2.8	5.35	1.64
HOUSTON																	
452560001A01	75	24	1.8	3.6	5.3	6.2	7.6	8.4	8.5	10.0	12.1	15.4	18.1	9.04	4.3	8.00	1.70
LUBBOCK																	
453340301A01	75*	16	2.0	2.5	2.8	3.1	3.1	3.3	3.5	3.6	4.4	5.1	8.8	3.84	1.6	3.60	1.42
PASADENA																	
454060002A01	75*	18	4.2	6.0	7.8	8.1	8.6	8.6	12.0	13.1	16.0	16.3	23.5	11.55	5.5	10.41	1.59
SAN ANTONIO																	
456570034A01	75*	23	LD	1.0	1.8	2.0	2.5	2.7	2.8	3.0	3.5	5.7	10.1	3.11	2.0	2.54	2.04
WICHITA FALLS																	
455560002A01	75*	17	1.7	2.5	2.9	3.5	4.7	6.5	7.1	7.9	8.2	9.7	12.4	6.36	3.0	5.58	1.75
UTAH																	
OGDEN																	
460680001A01	75*	23	1.3	1.5	2.2	2.8	3.5	3.8	4.2	4.6	5.7	13.9	21.8	5.43	4.9	4.12	2.03
SALT LAKE CITY																	
460920001A01	75	26	1.9	2.4	2.7	3.6	3.9	4.3	4.6	5.5	5.9	8.2	41.3	6.26	7.5	4.72	1.90
VERMONT																	
BURLINGTON																	
470140003A01	75	24	3.2	3.4	4.4	6.3	7.1	8.2	9.2	10.4	11.7	15.3	17.7	8.84	4.1	7.90	1.64
VIRGINIA																	
DANVILLE																	
480920001A01	75*	21	5.0	5.2	6.2	6.6	7.3	9.7	10.1	12.6	14.4	15.2	24.9	10.68	4.9	9.71	1.55
HAMPTON																	
481440001A01	75*	25	3.7	5.5	5.9	7.1	7.9	10.4	11.4	14.1	14.8	22.8	26.1	11.60	6.2	10.16	1.69
LYNCHBURG																	
481840001A01	75	21	4.7	5.3	6.1	6.6	7.7	8.3	9.4	10.4	15.4	18.5	27.6	10.62	5.8	9.44	1.61
NORFOLK																	
482140001A01	75*	21	4.4	6.0	7.3	8.3	8.9	11.1	12.9	15.1	16.2	21.9	25.8	12.62	6.0	11.33	1.61
PORTSMOUTH																	
482440001A01	75*	15	6.3	6.3	6.8	7.9	8.1	9.2	11.5	14.4	14.8	28.7	32.4	13.10	8.0	11.35	1.69
RICHMOND																	
482660002A01	75*	25	5.2	6.2	7.5	8.2	9.7	10.1	12.2	15.0	16.7	21.7	27.5	12.68	6.1	11.41	1.58
ROANOKE																	
482700003A01	75*	22	2.3	3.4	3.4	4.8	5.8	6.3	6.7	6.9	8.0	11.6	13.9	6.62	2.9	6.02	1.56
WASHINGTON																	
SEATTLE																	
491940001A01	75*	26	1.7	4.1	4.9	5.2	5.4	5.7	6.0	6.2	7.2	8.0	20.5	6.37	3.3	5.81	1.53
SPOKANE																	
492040001A01	75*	23	1.0	1.7	2.3	2.5	2.6	3.2	3.6	4.2	4.2	5.4	10.5	3.57	1.9	3.17	1.63
TACOMA																	
492140001A01	75	27	2.0	2.6	2.8	3.6	4.2	4.8	5.1	5.7	7.1	7.9	13.4	5.29	2.6	4.76	1.59
WEST VIRGINIA																	
CHARLESTON																	
500280001A01	75	24	6.3	6.7	8.4	9.7	14.7	16.1	16.6	22.2	29.6	37.0	51.8	19.94	12.7	16.56	1.86
SOUTH CHARLEST																	
501760001A01	75	25	5.4	7.8	8.4	8.8	9.3	11.8	13.5	15.8	25.2	35.3	44.1	16.54	11.2	13.73	1.61
WISCONSIN																	
EAU CLAIRE																	
510840002A01	75	23	3.4	3.9	5.1	5.5	5.7	6.1	7.6	8.0	8.3	9.9	13.1	6.90	2.3	6.53	1.40

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12403 - SULFATE
METHOD - 91 - HI-VOL (COLORIMETRIC
UNITS - 01 - UG/CU METER (25 C)

URBAN

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ANALYTICAL QUALITY CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
<10	5.9	+- 13.5
10-25	-4.2	+- 10.2
>25	.4	+- 10.2

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
WISCONSIN																	
KENOSHA																	
551540001A01	75*	17	4.6	6.1	6.7	7.5	8.3	9.1	9.4	11.2	17.4	19.5	30.8	11.74	6.8	10.33	1.64
MADISON																	
551860001A01	75*	19	3.9	4.2	5.1	6.2	7.0	7.8	8.4	9.7	10.7	13.3	17.4	8.68	3.6	7.95	1.54
MILWAUKEE																	
552200001A01	75	24	4.3	5.4	6.0	7.2	8.2	8.9	9.9	13.3	15.6	18.3	30.1	11.26	6.0	9.96	1.64
RACINE																	
552580002A01	75	23	3.4	5.8	6.5	7.4	8.0	8.4	9.8	10.6	12.4	20.0	29.3	10.70	6.0	9.49	1.62
SUPERIOR																	
553480001A01	75*	17	4.2	4.3	4.4	5.8	6.1	6.7	6.8	7.0	7.9	10.7	20.2	7.46	3.8	6.86	1.48
WYOMING																	
CASPER																	
520120001A01	75*	20	2.1	2.1	2.4	3.0	3.3	3.6	3.7	3.9	4.7	5.3	7.9	3.86	1.5	3.61	1.44

$REWIND NDWDATA.
FURPUR 27R3 E33 SL73R1 04/27/78 09:19:29

$RUN TPFS.ABS

POLLUTANT - 12403 - SULFATE
METHOD - 93 - HI-VOL COLORIMETRIC
UNITS - 01 - UG/CU METER (25 C)

NONURBAN

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ANALYTICAL QUALITY

CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
<10	5.9	+- 13.5
10-25	-4.2	+- 10.2
>25	.4	+- 10.2

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
ARKANSAS MONTGOMERY CO 041760001A03	75*	21	2.0	2.9	3.7	4.5	4.6	6.4	6.7	8.8	9.5	11.6	14.5	6.79	3.3	6.02	1.67
COLORADO MESA VERDE NAT 061530002A03	75*	22	LD	.6	.9	1.2	1.7	1.9	2.0	2.1	2.4	2.6	2.9	1.73	.7	1.52	1.80
FLORIDA HARDEE CO 101680001A03	75*	22	1.4	1.7	2.1	2.7	3.2	3.5	4.0	4.6	6.4	9.8	13.8	4.69	3.2	3.86	1.86
HAWAII HAWAII CO 120080001A03	75*	20	LD	NO. OF SAMPLES (13) BELOW MIN. DET. EXCEEDS 50%									3.5				
HAWAII CO 120090002A03	75*	22	LD	.7	.9	1.1	1.4	2.1	2.9	3.0	3.6	3.9	4.5	2.27	1.2	1.84	2.09
HAWAII VOLCANO 120090001A03	75*	14	LD	NO. OF SAMPLES (8) BELOW MIN. DET. EXCEEDS 50%									8.2				
IDAHO BUTTE CO 130340001A03	75*	23	LD	LD	.7	.8	1.1	1.2	1.6	1.6	2.2	3.3	4.0	1.57	1.1	1.19	2.27
INDIANA MONROE CO 152800001A03	75*	21	5.5	6.5	7.2	8.4	9.9	10.8	13.1	13.6	17.3	19.6	36.7	13.29	7.4	11.81	1.61
MAINE ACADIA NAT PAR 230010001A03	75*	19	2.3	2.6	3.5	3.8	4.7	5.6	6.6	6.9	7.9	12.5	15.5	6.74	3.9	5.80	1.74
MARYLAND CALVERT CO 210280001A03	75*	23	4.5	5.4	6.8	7.7	8.0	8.7	9.6	11.4	12.4	20.1	48.3	12.49	10.7	10.24	1.76
MISSISSIPPI JACKSON CO 251280001A03	75*	26	LD	1.0	3.4	4.6	4.8	6.4	7.2	8.0	8.9	10.5	16.6	6.71	4.1	4.89	2.84
MISSOURI SHANNON CO 264480002A03	75	24	2.2	2.2	3.5	4.6	5.3	5.6	6.2	6.7	7.5	13.7	17.2	6.60	3.8	5.73	1.71
MONTANA GLACIER NAT PA 270570001A03	75*	18	.6	.7	.9	1.0	1.2	1.4	1.6	1.8	2.1	3.2	4.4	1.77	1.1	1.50	1.77
POWDER RIVER L 271240008A03	75*	19	LD	LD	LD	1.1	1.1	1.5	1.6	1.6	1.7	3.7	4.4	1.55	1.2	1.11	2.51
NEBRASKA THOMAS CO 282480001A03	75*	17	.9	.9	.9	1.3	1.8	1.9	2.1	2.2	3.4	3.6	5.5	2.27	1.3	1.95	1.75
NEVADA WHITE PINE CO 290560001A03	75*	24	LD	LD	LD	LD	.6	.7	1.1	1.2	1.5	3.4	4.9				
NEW HAMPSHIRE COOS CO 300140001A03	75*	22	1.9	2.0	2.4	3.6	4.8	5.3	7.1	8.6	11.0	15.2	24.7	7.65	5.8	5.90	2.10
NEW YORK JEFFERSON CO 333340001A03	75*	21	.9	2.1	4.5	5.4	6.0	6.2	7.0	10.1	11.9	14.9	38.4	9.70	9.5	6.91	2.32
RHODE ISLAND WASHINGTON CO 410380002A03	75*	22	1.4	2.3	4.3	4.8	5.8	6.3	7.7	8.4	9.7	13.5	18.3	7.55	4.3	6.38	1.87
SOUTH CAROLINA RICHLAND CO 421900002A03	75*	26	2.4	3.5	3.7	4.5	5.3	5.4	6.4	6.7	7.2	8.6	13.3	6.17	2.7	5.65	1.53

* INDICATES YEARLY CRITERIA NOT MET

POLLUTANT - 12403 - SULFATE
METHOD - 91 - HI-VOL COLORIMETRIC
UNITS - 01 - UG/CU METER (25 C)

NONURBAN

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ANALYTICAL QUALITY

CONC. RANGE (UG/M3)	BIAS (%)	95% CONF. PRECISION (%)
<10	5.9	+- 13.5
10-25	-4.2	+- 10.2
>25	.4	+- 10.2

SITE:	YR	NO.	MIN	10	20	30	40	50	60	70	80	90	MAX	ARITHMETIC MEAN	ARITHMETIC STDEV	GEOMETRIC MEAN	GEOMETRIC STD
SOUTH DAKOTA																	
BLACK HILLS NA																	
430110001A03	75*	22	.6	.7	.9	1.1	1.3	1.5	1.7	1.8	2.0	2.6	4.8	1.66	.9	1.48	1.62
TENNESSEE																	
CUMBERLAND CO																	
440610001A03	75	27	1.5	3.6	5.2	6.3	7.8	8.6	9.0	10.1	10.8	16.1	20.9	9.02	4.8	7.69	1.87
TEXAS																	
MATAGORDA CO																	
453530001A03	75*	25	1.8	2.5	2.8	4.0	4.2	4.8	5.3	5.7	6.4	9.6	16.0	5.49	3.2	4.79	1.68
TOM GREEN CO																	
455200001A03	75*	24	LD	LD	1.0	1.5	1.9	2.6	3.4	4.2	4.6	6.6	7.7	3.10	2.1	2.25	2.58
VERMONT																	
ORANGE CO																	
470360001A03	75*	24	2.3	2.8	5.5	6.2	7.0	8.7	8.8	11.9	15.0	28.3	39.0	11.81	9.3	9.17	2.04
VIRGINIA																	
SHENANDOAH NAT																	
482890001A03	75*	19	2.2	3.3	4.4	4.6	5.7	6.2	7.1	8.5	9.4	13.7	21.5	7.77	4.6	6.70	1.73
WYTHE CO																	
483440001A03	75*	22	1.8	2.4	3.5	4.6	5.2	5.3	6.1	7.8	11.3	13.5	16.7	7.34	4.2	6.21	1.83
WASHINGTON																	
KING CO																	
490980002A03	75*	24	LD	LD	.7	1.5	2.5	2.5	3.1	3.8	4.0	5.5	9.8	2.97	2.2	2.10	2.64
WYOMING																	
YELLOWSTONE NA																	
520860001A03	75*	17	.6	.9	1.0	1.3	1.5	1.6	1.8	2.0	2.5	2.5	2.8	1.75	.6	1.62	1.52

APPENDIX A

GRUBB'S STATISTIC FOR THE DETECTION OF OUTLIERS

As a final test before data were summarized and released for publication, Grubb's test* was used to indicate outliers, i.e., questionable values that seemed to be excessively great. A computer program compiled the statistics and performed the tests for outliers. As many as three outliers were rejected for each pollutant at each site.

The procedure is to calculate the variance using all the data in the data set for a site, then repeat the calculation by eliminating the maximum value in succession. The calculation of variances continues until a total of four values of variance have been calculated, i.e., until the three highest concentration values have been temporarily eliminated from the data set. Whether to identify any of the maximum values from the data set as outliers was determined by calculating three ratios of variances and comparing these with F statistics in standard texts. The procedure is explained further by the equations that follow.

Values of variance were calculated as follows:

$$S^2 = \frac{\Sigma X^2 - (\Sigma X)^2/n}{n - 1} \qquad \text{(A-1)}$$

where S^2 = variance of data set about its mean value using all the data

X = individual concentration values

n = total number of data in the data set

Successive values of variance, labeled S_n, $S_{n,n-1}$, and $S_{n,n-1,n-2}$, were calculated by eliminating the maximum value in succession. Thus, the last value was calculated as follows:

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*Technometrics, 14(3), August 1972.

$$S^2_{n,n-1,n-2} = \frac{\Sigma Y^2 - (\Sigma Y)^2/N}{N - 1} \qquad \text{(A-2)}$$

where $S^2_{n,n-1,n-2}$ = variance of data set formed by eliminating the highest three concentrations

Y = individual concentration values of the new data set ($Y_i = X_i$ to $i = N$)

N = $n - 3$, three less than the number of data in the original data set

The three ratios of variance were calculated as follows:

$$L_1 = \frac{S^2_n}{S^2} \qquad \text{(A-3)}$$

$$L_2 = \frac{S^2_{n,n-1}}{S^2} \qquad \text{(A-4)}$$

$$L_3 = \frac{S^2_{n,n-1,n-2}}{S^2} \qquad \text{(A-5)}$$

APPENDIX B

CONFIDENCE LIMITS OF MEASURED VALUES

The usual formula for computing confidence limits of individual values when the precision is measured as the coefficient of variation is:

$$L_u = X[\,1 + t_{\alpha/2}\, C_v/100] \qquad \text{(B-1a)}$$

$$L_\ell = X[\,1 - t_{\alpha/2}\, C_v/100] \qquad \text{(B-1b)}$$

Where L_u = upper limit

X = the measured value

$t_{\alpha/2}$ = the t statistic for the desired confidence

C_v = the coefficient of variation expressed as a percentage

L_ℓ = lower limit

As an example, assume that the precision of an air pollution measurement system as measured by the coefficient of variation is 5.1 percent. An individually measured value of 47.5 $\mu g/m^3$ was observed. Assuming a 95-percent confidence interval ($\alpha = 0.05$) and a large number of degrees of freedom, $t_{0.025} = 1.96$. Therefore, the 95-percent confidence limits for the true value are

$$L_u = 47.5[\,1 + (1.96)(5.1)/100] \qquad \text{(B-2a)}$$

$$= 52.3\ \mu g/m^3$$

$$L_\ell = 47.5[\,1 - (1.96)\,(5.1)/100] \qquad \text{(B-2b)}$$

$$= 42.8\ \mu g/m^3$$

These limits are symmetric about the observed value.

Since use of the coefficient of variation implies that the precision is a function of the concentration level, a more correct formula for computing the confidence limits is:

$$L_u = \frac{X}{1 - t_{\alpha/2}\, C_v/100} \qquad \text{(B-3a)}$$

$$L_\ell = \frac{X}{1 + t_{\alpha/2}\, C_v/100} \qquad \text{(B-3b)}$$

Using the data in the previous example the upper and lower 95 percent confidence limits are

$$L_u = \frac{47.5}{1 - (1.96)(5.1)/100} = 52.8\ \mu g/m^3 \qquad \text{(B-4a)}$$

$$L_\ell = \frac{47.5}{1 + (1.96)(5.1)/100} = 43.2 \text{ percent} \qquad \text{(B-4b)}$$

These limits are asymmetric (as they should be) about the observed value and they result in a slightly wider confidence interval than given by B-2a and B-2b.

The graphical representation of the procedure is shown in Figure B-1.

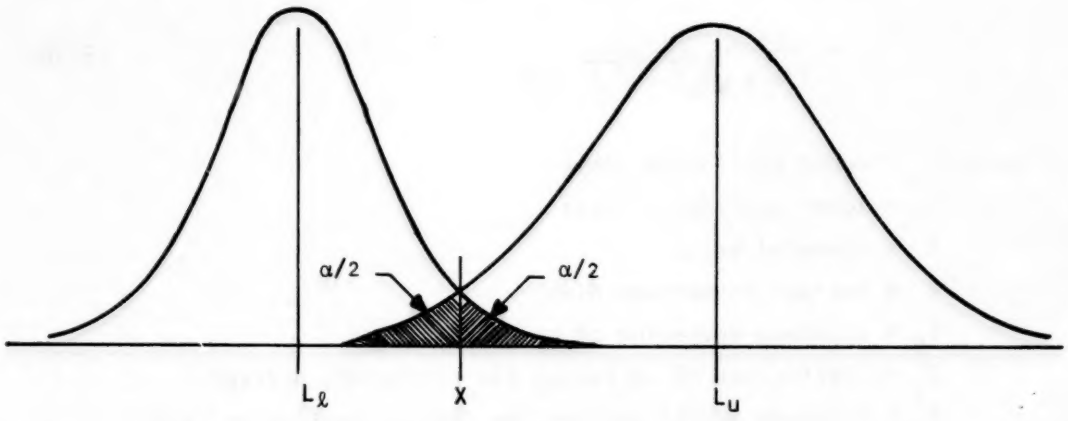

Figure B-1. Graphical representation of upper and lower confidence intervals of an individually-measured concentration value when precision is evaluated over a range of concentration levels

The confidence limits in equation B-3 were derived from Figure B-1 as follows:

$$X = L_u(1 - t_{\alpha/2}\, C_v/100) \tag{B-5a}$$

$$X = L_\ell(1 + t_{\alpha/2}\, C_v/100) \tag{B-5b}$$

Therefore,

$$L_u = \frac{X}{1 - t_{\alpha/2}\, C_v/100} \tag{B-6a}$$

$$L_\ell = \frac{X}{1 - t_{\alpha/2}\, C_v/100} \tag{B-6b}$$

The general formula for computing confidence intervals when both bias and precision are in percentage of concentration level, and when the bias varies from time to time in random manner, is as follows:

$$L_u = \frac{X(1 - B/100)}{1 - k\sqrt{S_B{}^2 + C_v{}^2}\,/100} \tag{B-7a}$$

$$L_\ell = \frac{X(1 - B/100)}{1 + k\sqrt{S_B{}^2 + C_v{}^2}\,/100} \tag{B-7b}$$

where L_u = upper confidence limit
L_ℓ = lower confidence limit
X = measured value
B = average percentage bias
S_B = standard deviation of percentage bias
C_v = coefficient of variation for precision, percent
k = standard normal deviate for desired confidence level